

JUNIOR ENGINEER/Intermediate Grade Apprentice/ELECTRICAL DEPARTMENT

SECTION - A

I. General Knowledge including technical parameters of RWF

1. In which year did the first train steam off in India?
 - a. 1848
 - b. **1853**
 - c. 1875
 - d. 1880
2. Where are the headquarters of the East Coast Railways located?
 - a. Visakhapatnam
 - b. Kolkata
 - c. Hyderabad
 - d. **Bhubaneswar**
3. Which train of the Indian Railways has the longest route length?
 - a. Howrah to Jammu Tawi Himgiri Express
 - b. KanyaKumari - Jammu Tawi Himsagar Express
 - c. **Kanya Kumari - Dibrugarh Vivek Express**
 - d. Guwahati - Thiruvananthapuram Express
4. In which city is the Railway Staff College of Indian Railways located?
 - a. Pune
 - b. Delhi
 - c. **Vadodara**
 - d. Allahabad
5. On which of the following is the longest railway bridge of Indian Railways located?
 - a. River Ganges
 - b. **Vembanad lake**
 - c. River Brahmaputra
 - d. Chilka lake

6. In which city are 3 zonal headquarters of Indian Railways located?
- a. Guwahati
 - b. Mumbai
 - c. New Delhi
 - d. Kolkata**
7. Who of the following is known for having designed the first railway time-tables?
- a. George Bradman
 - b. George Bernard Shaw
 - c. George Bradshaw**
 - d. George Brummel
8. Which of the following is the largest railway junction of the Indian Railways?
- a. Delhi
 - b. Bhatinda
 - c. Mathura**
 - d. Prayagraj
9. Which of the following is the easternmost division of the Indian Railways?
- a. Tinsukia**
 - b. Lumding
 - c. Rangiya
 - d. Katihar
10. Over which of the following rivers has the world's highest railway bridge been constructed?
- a. Chenab**
 - b. Jhelum
 - c. Sutlej
 - d. Indus
11. Which station of the Indian Railways has the longest railway platform in the world?
- a. Gorakhpur
 - b. Pt. Deen Dayal Upadhyay Rly Stn
 - c. SSS Hubli Jn**
 - d. Kharagpur

12. Which of the following stations of Indian Railways has all the three gauges viz. broad, metre and narrow?
- a. Lucknow
 - b. Chandigarh
 - c. Shimla
 - d. Siliguri**
13. What is the width of a broad gauge railway line in Indian Railways?
- a. 5 feet 3 inches
 - b. 5 feet 6 inches**
 - c. 4 feet 11 inches
 - d. 5 feet 4 inches
14. Which Railway Minister presented the last Railway Budget before it was merged with the general budget?
- a. Piyush Goyal
 - b. Sadananda Gowda
 - c. Suresh Prabhu**
 - d. Ashwini Vaishnav
15. Which of the following stations of Indian Railways was formerly known as Victoria Terminus?
- a. Churchgate Railway Station
 - b. Mumbai Central
 - c. Lokmanya Tilak Terminus
 - d. Chhatrapati Shivaji Terminus**
16. Fairy Queen, the world's oldest steam locomotive in regular operation plies between New Delhi and
- a. Shimla
 - b. Alwar**
 - c. Kalka
 - d. Gwalior
17. Who of the following was the first Railway Minister of independent India?
- a. John Mathai**
 - b. Lal Bahadur Shastri
 - c. Jawaharlal Nehru
 - d. Shanmugham Shetty

18. To commemorate the 100th anniversary of which Indian personality, were the Shatabdi Express trains introduced in 1989?
- a. Swami Vivekanand
 - b. Mahatma Gandhi
 - c. Jawaharlal Nehru**
 - d. Rabindranath Tagore
19. Who was the Governor General of India when railways were first introduced in India?
- a. Lord Canning
 - b. Lord Dalhousie**
 - c. Lord William Bentick
 - d. Lord Ripon
20. In which city is the Wheel and Axle Plant of the Indian Railways located?
- a. Kapurthala
 - b. Varanasi
 - c. Bengaluru**
 - d. Rae Bareilly
21. What is the rank of India in the world in terms of length of railroad network?
- a. Bombay Baroda Railway
 - b. The Scindia Railway
 - c. Central India Railway
 - d. Great Indian Peninsula Railway**
22. Which of the following ran the first train from Bori Bunder to Thane in 1853?
- a. Bombay Baroda Railway
 - b. The Scindia Railway
 - c. Central India Railway
 - d. Great Indian Peninsula Railway**
23. Which country does the Maitree Express connect India with?
- a. Myanmar
 - b. Pakistan
 - c. Bangladesh**
 - d. Nepal

24. Which of the following zones of Indian Railways is the largest in terms of route kilometers?
- a. Western Railways
 - b. Eastern Railways
 - c. Northern Railways**
 - d. Southern Railways
25. Which of the following is the largest marshalling yard in India (also the longest in Asia)?
- a. Mughalsarai**
 - b. Mathura
 - c. Itarsi
 - d. Guntakal
26. Through which of the following group of states does the Konkan Railways run?
- a. Maharashtra-Karnataka-Telangana-Kerala
 - b. Maharashtra-Karnataka-Goa-Kerala**
 - c. Maharashtra-Karnataka-Kerala-Tamil Nadu
 - d. Karnataka-Goa-Kerala-Tamil Nadu
27. Which of the following zonal headquarters-city combinations is incorrect?
- a. South East Central - Bilaspur
 - b. North Western - Jodhpur**
 - c. East Central - Hajipur
 - d. West Central - Jabalpur
28. Which of the following zones of Indian Railways administers the Matheran Hill Railway?
- a. Konkan Railways
 - b. Western Railways
 - c. Central Railways**
 - d. Southern Railways
29. In which city is the Indian Railway Institute of Financial Management (IRIFEM) located?
- a. Secunderabad**
 - b. Lucknow
 - c. Rae Bareilly
 - d. Gurgaon

30. Which of the following cities is the National Rail Museum located?
- a. Mumbai
 - b. New Delhi**
 - c. Hyderabad
 - d. Chennai
31. The first railway line in India was opened by the British from -
- a. Delhi to Bombay
 - b. Bombay to Thane**
 - c. Calcutta to Allahabad
 - d. Bombay to Madras
32. Into how many zones is the Indian Railways organised?
- a. 18**
 - b. 16
 - c. 14
 - d. 17
33. Which state has the longest route kilometers of railway line in India?
- a. Maharashtra
 - b. Andhra Pradesh
 - c. Rajasthan
 - d. Uttar Pradesh**
34. Headquarters of which one among the following railway zones of Indian Railways is situated at the highest elevation from the mean sea level?
- a. East Central Railway
 - b. South Eastern Railway
 - c. South Western Railway**
 - d. West Central Railway
35. Which famous railway station has been renamed Pandit Deen Dayal Upadhyay Nagar railway station?
- a. Mughalsarai**
 - b. Hazrat Nizamuddin
 - c. Allahabad
 - d. Mathura

36. Which of the following is the first railway station of the Indian Railways to run fully on solar power?
- a. New Delhi
 - b. Guwahati**
 - c. Nagpur
 - d. Bengaluru
37. UTS (Unreserved Ticketing System) is a mobile app developed by -
- a. C-DAC
 - b. IRCTC
 - c. CRIS**
 - d. Infosys
38. In which year was the building of Chhatrapati Shivaji Terminus (formerly Victoria Terminus) constructed?
- a. 1918
 - b. 1908
 - c. 1898
 - d. 1888**
39. Who of the following was the architect of the famous Chhatrapati Shivaji Terminus (formerly Victoria Terminus)?
- a. F.W. Stevens**
 - b. George Wittet
 - c. Herbert Baker
 - d. Edward Lutyens
40. At which place is the National Rail and Transportation University located?
- a. Jabalpur
 - b. Guwahati
 - c. Vadodara**
 - d. Mysuru
41. On which route was the first Swarna Rajdhani Express run in November 2017 under Project Swarna with improved passenger amenities, aesthetics and hygiene standards?
- a. New Delhi to Sealdah**
 - b. New Delhi to Ahmedabad
 - c. New Delhi to Visakhapatnam
 - d. New Delhi to Goa

42. Which of the following is a fully unreserved superfast train of the Indian Railways?
- a. Antyodaya Express
 - b. Humsafar Express**
 - c. Garib Rath Express
 - d. Suvidha Express
43. In which year was the Pamban bridge connecting India's mainland to Rameswaram island commissioned?
- a. 1898
 - b. 1907
 - c. 1912
 - d. 1914**
44. The inaugural run of Tejas Express in 2017 was between -
- a. Mumbai and Surat
 - b. Delhi and Chandigarh
 - c. Mumbai and Goa**
 - d. Delhi and Vadodara
45. What is the purpose of using fish plates in railway tracks?
- a. fix rails to the sleepers
 - b. fix sleepers to the ground
 - c. join two rails**
 - d. join two coaches
46. Deccan Queen is a popular train of Indian Railways which runs between which two stations?
- a. Mumbai and Pune**
 - b. Mumbai and Goa
 - c. Bengaluru and Mysore
 - d. Hyderabad and Bidar
47. Which railway station of the Indian Railways is located at the highest altitude?
- a. Ghum**
 - b. Ooty
 - c. Shimla
 - d. Kalka

48. Which zone of the Indian Railways operates the Darjeeling Himalayan Railway?
- a. North Eastern Railway
 - b. Northeast Frontier Railway**
 - c. East Central Railway
 - d. Eastern Railway
49. On which route was India's first CNG powered train inaugurated in 2015?
- a. Panipat to Ambala
 - b. Rewari to Rohtak**
 - c. Ajmer to Jaipur
 - d. Vadodara to Anand
50. How much time does the Gatimaan Express, India's fastest train, take to cover the distance between Delhi and Agra?
- a. 60 minutes
 - b. 80 minutes
 - c. 100 minutes**
 - d. 120 minutes
51. In which year did Shri Suresh Prabhu present the last railway budget of India?
- a. 2014
 - b. 2015
 - c. 2016**
 - d. 2017
52. Where are the headquarters of Konkan Railways located?
- a. Mumbai**
 - b. Mangalore
 - c. Goa
 - d. Kochi
53. Where is the Indian Railway Institute of Mechanical and Electrical Engineering located?
- a. Lucknow
 - b. Jamalpur**
 - c. Pune
 - d. Secunderabad

54. India's longest railway tunnel is located between -
- a. Jammu and Katra
 - b. Katra and Banihal
 - c. Banihal and Qazigund**
 - d. Qazigund and Anantnag
55. What is the assured sum given to the nominee of the confirmed/RAC railway passenger whose death occurs in a railway accident as per Optional Travel Insurance Scheme launched in 2016?
- a. Rs. 1,00,000
 - b. Rs. 2,00,000
 - c. Rs. 5,00,000
 - d. Rs. 10,00,000**
56. How many stations have been identified for development under Adarsh Station Scheme?
- a. 1253**
 - b. 1352
 - c. 986
 - d. 765
57. In which State have the highest number of stations been identified for development under Adarsh Station Scheme?
- a. Uttar Pradesh
 - b. Tamil Nadu
 - c. West Bengal**
 - d. Maharashtra
58. In which year were the Rajdhani trains introduced by Indian Railways?
- a. 1969**
 - b. 1966
 - c. 1963
 - d. 1960
59. On which route was the first Vande Bharat Express introduced in 2019?
- a. Mumbai and Ahmedabad
 - b. New Delhi and Varanasi**
 - c. New Delhi and Bhopal
 - d. Chennai and Bengaluru

60. How many stations are to be initially redeveloped under the Amrit Bharat Scheme, the foundation stone of which was recently laid in August 2023?
- a. 312
 - b. 424
 - c. 484
 - d. 508**
61. What does the letter N stand for in the abbreviation PNR Number which is allotted on reservations of tickets in Indian Railways?
- a. Name**
 - b. Numerical
 - c. Nominal
 - d. Notional
62. If a passenger is allotted a waiting list which say RLWL/32, the R in RLWL stands for -
- a. Remote**
 - b. Railways
 - c. Reasonable
 - d. Reservation
63. Some trains called EMUs are run by Indian Railways. What does M stand for in EMU?
- a. Mechanical
 - b. Metro
 - c. Mainline
 - d. Multiple**
64. On which of the following voltages does the system of train lighting (bulbs and fans in compartments) work?
- a. 230 V AC
 - b. 220 V DC
 - c. 110 V DC**
 - d. 24 V DC
65. What is the voltage used for electric traction in Indian Railways (i.e. voltage available on overhead lines)?
- a. 25 kV AC**
 - b. 11 kV AC
 - c. 2.5 kV DC
 - d. 11 kV DC

66. Under whose tenure as Railway Minister, were the Garib Rath trains introduced by Indian Railways?
- a. Mamta Banerjee
 - b. Lalu Prasad Yadav**
 - c. Nitish Kumar
 - d. Ram Vilas Paswan
67. How many stars does the official logo of Indian Railways have?
- a. 15
 - b. 16
 - c. 17**
 - d. 18
68. What is the name of the mascot of the Indian Railways?
- a. Bholu**
 - b. Appu
 - c. Kaka
 - d. Gopu
69. What is the station which has three routes passing through it known as?
- a. Central
 - b. Terminal
 - c. Junction**
 - d. Cantt.
70. Which station of the Indian Railways has the most number of platforms?
- a. New Delhi
 - b. Howrah**
 - c. Mumbai CST
 - d. Chennai Central
71. What is the duplex process used for?
- a) Manufacturing of steel for rails**
 - b) Manufacturing of bolts
 - c) Coning of wheels
 - d) Transportation of wheels
72. What is done to distinguish the rails?
- a) They are colour coded**
 - b) They have numbers
 - c) They are manufactured by different processes
 - d) They cannot be distinguished

73. What is the value of Tolerance for Horizontal straightness of Class A rails?
- a) 3mm
 - b) 1mm
 - c) 0.5mm**
 - d) 0.8mm
74. What is the Tup test also known as?
- a) Hammer blow test
 - b) Falling weight test**
 - c) Deviation test
 - d) Compressibility test
75. What is the height from which the weight is dropped in the falling weight test?
- a) 10m
 - b) 7.2m**
 - c) 9.8m
 - d) 6m
76. The tensile strength of the rail should not be less than _____
- a) 100kg/mm
 - b) 85kg/m²
 - c) 72kg/mm²**
 - d) 98kg/m²
77. Where are third quality rails used?
- a) Industrial sidings**
 - b) Steep gradients
 - c) Hilly regions
 - d) They cannot be used
78. Third quality rails are painted by which colour on the end face?
- a) Black
 - b) White**
 - c) Yellow
 - d) Red

79. 90 UTS rails are more resistant against wear and tear as compared to Manganese rails with 72UTS

- a) **True**
- b) False

80. What is the advantage of End hardened rails?

- a) Easy to manufacture
- b) **Less End batter**
- c) Maximum end batter
- d) Less cost

II. General English

81. Fill in the blank: He has been working here ____ five years.

- a) since
- b) from
- c) **for**
- d) during

82. Choose the correct synonym for the word 'Abundant':

- a) Scarce
- b) **Plentiful**
- c) Rare
- d) Little

83. Identify the correct antonym for 'Benevolent':

- a) Kind
- b) **Cruel**
- c) Generous
- d) Helpful
- d) Little

84. Choose the correctly spelled word:

a) Recieve

b) Receive

c) Receeve

d) Recive

85. Select the appropriate preposition: She is good ____ mathematics.

a) in

b) with

c) at

d) on

86. Choose the correct synonym for the word 'Brave':

a) Shy

b) Cowardly

c) Afraid

d) Courageous

87. Identify the correct antonym for 'Artificial':

a) Natural

b) Fake

c) Synthetic

d) Plastic

88. Choose the correct form: The child ____ when the bell rang.

a) was crying

b) cry

c) has cried

d) cried

89. Choose the correct synonym for the word 'Diligent':

- a) Tardy
- b) Forgetful
- c) Lazy
- d) Hardworking**

90. Identify the correctly punctuated sentence:

- a) It's raining**
- b) Its' raining
- c) It raining
- d) Its raining

91. Choose the correct synonym for 'Generous':

- a) Kind**
- b) Strict
- c) Mean
- d) Selfish

92. Fill in the blank: She ____ to the market every day.

- a) going
- b) goes**
- c) gone
- d) go

93. Identify the correct antonym for 'Optimistic':

- a) Joyful
- b) Hopeful
- c) Pessimistic**
- d) Cheerful

94. Choose the correctly spelled word:

- a) Acomodate
- b) Accommodate**
- c) Accomodate
- d) Acommodate

95. Select the appropriate preposition: The cat is hiding ____ the sofa.

- a) on
- b) above
- c) in
- d) under**

96. Choose the correct synonym for 'Swift':

- a) Heavy
- b) Slow
- c) Lazy
- d) Quick**

97. Identify the correct antonym for 'Flexible':

- a) Bendable
- b) Stretchy
- c) Elastic
- d) Rigid**

98. Choose the correct verb form: He ____ a song right now.

- a) sings
- b) sang
- c) is singing**
- d) sing

99. Choose the correct synonym for 'Silent':

- a) Loud
- b) Noisy
- c) Roaring
- d) Quiet**

100. Identify the correctly punctuated sentence:

- a) Where is your book?**
- b) Where is your book!
- c) Where is your book
- d) Where is your book.

101. Choose the word that is most similar in meaning to "Candid":

- a) Secretive
- b) Frank**
- c) Reserved
- d) Polite

102. Choose the correct sentence:

- a) He don't like tea.
- b) He doesn't like tea.**
- c) He doesn't likes tea.
- d) He do not like tea.

103. Select the correct antonym of "Reluctant":

- a) Hesitant
- b) Slow
- c) Reserved
- d) Willing**

104. Identify the part of speech of the word "quickly":

- a) Noun
- b) Adjective
- c) Adverb**
- d) Verb

105. Fill in the blank: I have been living here ____ 2015.
- a) for
 - b) by
 - c) since**
 - d) at
106. Choose the correct passive voice: "She writes a letter."
- a) A letter written by her.
 - b) A letter is wrote by her.
 - c) A letter is written by her.**
 - d) A letter has been written by her.
107. Identify the correctly punctuated sentence:
- a) He said "he was coming."
 - b) He said, "He was coming."**
 - c) He said "He was coming".
 - d) He said, "he was coming".
108. Which sentence is in the future perfect tense?
- a) She will be cooking dinner.
 - b) She cooked dinner.
 - c) She will have cooked dinner.**
 - d) She has cooked dinner.
109. Choose the correct synonym for "Eloquent":
- a) Silent
 - b) Harsh
 - c) Expressive**
 - d) Hesitant
110. Choose the correct synonym of "Banish":
- a) Welcome
 - b) Embrace
 - c) Expel**
 - d) Include

111. **Fill in the blank: The book is divided ____ five chapters.**
a) between
b) into
c) on
d) by
112. **Choose the correct sentence:**
a) Neither the students nor the teacher have arrived.
b) Neither the students nor the teacher has arrived.
c) Neither the students or the teacher has arrived.
d) Neither students nor teacher have arrived.
113. **Select the antonym of "Generous":**
a) Charitable
b) Stingy
c) Helpful
d) Giving
114. **What part of speech is the word "beauty" in the sentence: "She admired the beauty of the sunset"?**
a) Noun
b) Verb
c) Adjective
d) Adverb
115. **Choose the correctly spelled word:**
a) Embarras
b) Embarass
c) Embarrasment
d) Embarrassment
116. **Identify the sentence in the past perfect tense:**
a) She was eating.
b) She had eaten.
c) She eats.
d) She is eating.

117. **Choose the correct indirect speech: He said, "I am tired."**

- a) **He said that he was tired.**
- b) He says he is tired.
- c) He told he is tired.
- d) He said he tired.

118. **Fill in the blank: They walked slowly ____ the path.**

- a) on
- b) to
- c) **along**
- d) in

119. **Choose the correct synonym of "Obsolete":**

- a) Current
- b) Modern
- c) **Outdated**
- d) Rare

120. **Choose the correct antonym of "Hostile":**

- a) Aggressive
- b) Violent
- c) **Friendly**
- d) Harsh

121. **Identify the part of speech of the word "joyful":**

- a) Noun
- b) Verb
- c) **Adjective**
- d) Adverb

122. **Choose the correct sentence:**

- a) Each of the boys have done their homework.
- b) **Each of the boys has done his homework.**
- c) Each of the boy has done his homework.
- d) Each boys has done his homework.

123. **Fill in the blank: He is the man ____ helped me yesterday.**

- a) whom
- b) which
- c) **who**

d) whose

124. **Choose the correctly spelled word:**

- a) Occurence
- b) Ocurrance
- c) Occurrence**
- d) Occurance

125. **Which sentence is in the present continuous tense?**

- a) She is watching TV.**
- b) She watched TV.
- c) She has watched TV.
- d) She will watch TV.

126. **Choose the correct passive form: "They will complete the work by Monday."**

- a) The work will completed by Monday.
- b) The work will be completed by Monday.**
- c) The work was completed by Monday.
- d) The work is being completed by Monday.

127. **What is the plural form of "analysis"?**

- a) Analysises
- b) Analysis
- c) Analyses**
- d) Analys

128. **Choose the synonym of "Swift":**

- a) Slow
- b) Quick**
- c) Hard
- d) Sudden

129. **Fill in the blank: She has no interest ____ politics.**

- a) for
- b) on
- c) in**
- d) with

130. Choose the correct meaning of the idiom: “Hit the sack”:
- a) To get into a fight
 - b) To go to bed**
 - c) To pack a bag
 - d) To leave quickly

III. Official Language Policy and Rules

131. What is the Official Language of the Union of India
- A) Hindi in Devanagari Script**
 - B) English Script
 - C) Bengali Script
 - D) Kashmir
132. Which form of numerals are to be used for official purposes of the Union
- A) Roman Numeral
 - B) International form of Indian numerals**
 - C) Devanagari Numerals
 - D) Regional Numeral
133. Which part of the Constitution contains provisions regarding Official Language?
- a. Part XV
 - b. Part XVI
 - c. Part XVII
 - d. Part XVIII**
134. On which date Part XVII of the Constitution was passed in Parliament?
- a. August 10, 1949
 - b. 14.09.1949**
 - c. October 10, 1949
 - d. November 10, 1949
135. How many chapters are there in Part XVII of the Constitution?
- a. 4 Chapters**
 - b. 3 Chapters
 - c. 2 Chapters
 - d. 8 Chapters

136. How many articles are there in Part XVII of the Constitution?
- a. **9 Articles**
 - b. 2 Articles
 - c. 7 Articles
 - d. 1 Articles
137. What are all the nine Articles covered under Part XVII of the Constitution?
- a. Articles 340-348
 - b. **Articles 343-351**
 - c. Articles 345-353
 - d. Articles 350-358
138. In which part and in which article of the constitution the provision regarding the language to be used for Transaction of business in Parliament exists?
- a. Part V, Article 110
 - b. Part V, Article 115
 - c. **Part V, Article 120**
 - d. Part XVII, Article 348
139. In which part and in which article of the constitution the provision regarding the language to be used for the transaction of business in State Legislatures exists?
- a. Part V, Article 120
 - b. Part VI, Article 200
 - c. **Part VI, Article 210**
 - d. Part XVII, Article 348
140. Which article of the constitution contains a provision regarding the language to be used in courts etc.?
- a. Article 120
 - b. Article 210
 - c. Article 343
 - d. **Article 348 & 349**
141. Which article of the constitution contains a provision regarding the official language of the Union of India?
- a. Article 120
 - b. Article 210
 - c. **Article 343 & 344**
 - d. Article 348

142. Which article of the constitution contains a provision regarding the official language of States?
- a. Article 343
 - b. Article 345**
 - c. Article 348
 - d. Article 350
143. As per Article 343(1) of the constitution when Hindi became the official language of the Union of India?
- a. January 26, 1950
 - b. January 26, 1965**
 - c. August 15, 1947
 - d. January 1, 1970
144. Name the articles of the constitution which in their provisions contain a reference to Eighth Schedule of the constitution?
- a. Articles 120 and 210
 - b. Articles 343 and 348
 - c. Articles 344(1) and 351**
 - d. Articles 345 and 350
145. In which part of the constitution are the articles 343-351, that gives information about Official Language available?
- a. Part V
 - b. Part VI
 - c. Part XI
 - d. Part XVII**
146. At present how many languages are enlisted in the Eighth Schedule of the Constitution?
- a. 18
 - b. 20
 - c. 22**
 - d. 25

147. When the Constitution was adopted, how many languages were included in the Eighth Schedule initially?
- a. **Fourteen**
 - b. Seventeen
 - c. Twelve
 - d. D) Sixteen
148. In which year Maithili, Bodo, Dogri and Santhali were added to the Eighth Schedule later?
- a. 2005
 - b. **2003**
 - c. 2012
 - d. 2002
149. In which year Sindhi was added to the Eighth Schedule?
- a. 1956
 - b. 1965
 - c. **1967**
 - d. 1981
150. In which year Nepali, Konkani & Manipuri were added to the 8th Schedule?
- a. 1995
 - b. 1989
 - c. 1988
 - d. **1992**
151. Which one is the foreign language included in the 8th Schedule?
- a. **Nepali**
 - b. Bangladesh
 - c. Sri Lanka
 - d. Sindhi
152. Which is the Official Language of Arunachal Pradesh?
- a. Telugu
 - b. **English**
 - c. Marathi
 - d. Hindi
153. When was the Official Language Act 1963 passed?

- a. **10.05.1963**
 - b. 09.3.1965
 - c. 02.08.1988
 - d. 11.11.1971
154. when did section 3(3) of the Official Language Act take effect?
- a. 24 March 1965
 - b. 22 September 1932
 - c. **26 January 1965**
 - d. 25 May 1970
155. When was the Official Language Act, 1963 was amended?
- a. **1967**
 - b. 1965
 - c. 1955
 - d. 1985
156. How many sections are there in the Official Language Act 1963, as amended in the year 1967?
- a. 10 Sections
 - b. 8 sections
 - c. 3 Sections
 - d. **9 Sections**
157. With which section 7 of Official Language Act,1963 is concerned?
- a. Powers of President
 - b. **Continued use of English for certain purposes**
 - c. Language for High Courts
 - d. Duties of Union Government
158. Why was the Official Languages Act 1963 passed?
- a. To make Hindi the sole official language
 - b. **To provide for the continued use of English for official purposes**
 - c. To promote regional languages
 - d. To abolish English language
159. When was the Resolution on Official Language passed by Parliament?

- a. January 18, 1965
 - b. January 18, 1968**
 - c. January 26, 1950
 - d. August 15, 1947
160. When were Official Languages Rules passed?
- a. 1963
 - b. 1968
 - c. 1975
 - d. 1976**
161. What is the primary purpose of Discipline and Appeal Rules?
- A) To punish employees
 - B) To maintain discipline and ensure accountability**
 - C) To promote employees
 - D) To fix salary
162. Which of the following is a type of misconduct?
- A) Good performance
 - B) Unauthorized absence**
 - C) Teamwork
 - D) Punctuality
163. What is the purpose of an appeal under Discipline and Appeal Rules?
- A) To punish employees
 - B) To provide a fair hearing and redress grievances**
 - C) To promote employees
 - D) To fix salaries
164. Who is authorized to impose penalties under Discipline and Appeal Rules?
- A) Any employee
 - B) Disciplinary authority**
 - C) Union representative
 - D) Customer

165. What is the difference between a minor penalty and a major penalty?
- A) Minor penalty is more severe
 - B) Minor penalty is less severe, while major penalty is more severe**
 - C) Both are the same
 - D) None of the above
166. Which of the following is a minor penalty?
- A) Dismissal
 - B) Censure**
 - C) Removal
 - D) Compulsory retirement
167. What is the purpose of a show-cause notice?
- A) To inform employees of promotions
 - B) To inform employees of alleged misconduct and seek explanation**
 - C) To fix salaries
 - D) To provide training
168. Who can file an appeal under Discipline and Appeal Rules?
- A) Any employee
 - B) Aggrieved employee**
 - C) Disciplinary authority
 - D) Union representative
169. What is the time limit for filing an appeal under Discipline and Appeal Rules?
- A) 30 days
 - B) As specified in the rules or regulations**
 - C) 60 days
 - D) 90 days
170. What is the role of the appellate authority?
- A) To impose penalties
 - B) To review the decision of the disciplinary authority**
 - C) To investigate misconduct
 - D) To provide training
171. Which of the following is a type of disciplinary action?
- A) Promotion
 - B) Suspension**
 - C) Transfer
 - D) Training

172. What is the purpose of a disciplinary inquiry?
- A) To punish employees
 - B) To investigate alleged misconduct and determine guilt**
 - C) To promote employees
 - D) To fix salaries
173. Who can conduct a disciplinary inquiry?
- A) Any employee
 - B) Inquiry officer or disciplinary authority**
 - C) Union representative
 - D) Customer
174. What is the purpose of a charge sheet?
- A) To inform employees of promotions
 - B) To inform employees of alleged misconduct and seek explanation**
 - C) To fix salaries
 - D) To provide training
175. Which of the following is a major penalty?
- A) Censure
 - B) Removal**
 - C) Suspension
 - D) Warning
176. What is the role of the disciplinary authority in disciplinary proceedings?
- A) To investigate misconduct
 - B) To impose penalties and ensure accountability**
 - C) To provide training
 - D) To promote employees
177. Which of the following is a principle of disciplinary proceedings?
- A) Bias
 - B) Fairness and impartiality**
 - C) Punishment without reason
 - D) None of the above
178. What is the purpose of an appeal hearing?
- A) To punish employees
 - B) To provide a fair hearing and redress grievances**
 - C) To promote employees

D) To fix salaries

179. Who can represent an employee in a disciplinary inquiry?

- A) Any employee
- B) Defense representative or union representative**
- C) Disciplinary authority
- D) Customer

180. What is the significance of timelines in disciplinary proceedings?

- A) To delay proceedings
- B) To ensure timely resolution and fairness**
- C) To punish employees
- D) To promote employees

181. An appeal submitted after the due date may be:

- a) Automatically rejected
- b) Referred to court
- c) Accepted with justification**
- d) Forwarded to Inquiry Officer

182. During inquiry, a government servant is given:

- a) No chance to defend
- b) Only written representation
- c) Opportunity to cross-examine witnesses**
- d) Retirement benefits

183. The first stage advice of CVC is sought:

- a) Before issue of charge sheet**
- b) After penalty
- c) Before suspension
- d) After appeal

184. When can a major penalty be imposed without inquiry?

- a) On minor misconduct
- b) When employee admits guilt**
- c) Never
- d) If department decides

185. Inquiry officer must submit the report to:
- a) Appellate authority
 - b) Presenting officer
 - c) Complainant
 - d) Disciplinary authority**
186. Can a government servant withdraw his appeal?
- a) No
 - b) Yes, with approval**
 - c) Yes, anytime
 - d) Only during inquiry
187. Penalty must be imposed by:
- a) Any officer
 - b) Vigilance
 - c) Disciplinary authority**
 - d) Court
188. Suspension can be extended:
- a) Indefinitely
 - b) By court order
 - c) With review and reasons**
 - d) On employee's request
189. When was Official Languages Rules amended?
- a. 1965
 - b. 1987**
 - c. 1970
 - d. 1975
190. Into how many Regions Indian states have been classified, according to Official Languages Rules?
- a. 1965
 - b. 1987**
 - c. 1970
 - d. 1975
191. What are all the 3 Regions as classified under Official Languages Rules?
- a. 10 States, 2 Union Territory**

- b. 9 States, 3 Union Territories
 - c. 11 States, 1 Union Territory
 - d. 8 States, 4 Union Territories
192. How many States and Union Territories are there in Region 'A'?
- a. 8 States, 4 Union Territories
 - b. 11 States, 1 Union Territory
 - c. 9 States, 3 Union Territories**
 - d. 10 States, 2 Union Territories
193. When is "Hindi Day" celebrated every year?
- a. 14th September**
 - b. 15th October
 - c. 6th August
 - d. 17th June
194. Which are the states that come under Region 'A'?
- a. Assam, Bihar, Chhattisgarh, Jharkhand, Uttar Pradesh, Uttarakhand,
 - b. Haryana, Himachal Pradesh, Rajasthan, Madhya Pradesh
 - c. Gujarat, Maharashtra, Goa, Daman and Diu, Dadra and Nagar Haveli
 - d. Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand, Madhya Pradesh, Rajasthan, Uttar Pradesh, Uttarakhand**
 - e. Kerala, Tamil Nadu, Karnataka, Andhra Pradesh
195. 637. Which are the states that come under Region 'B'?
- a. Assam, Meghalaya, Manipur, Mizoram, Nagaland, Arunachal Pradesh, Tripura**
 - b. Gujarat, Maharashtra, Goa, Daman and Diu, Dadra and Nagar Haveli
 - c. Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand,
 - d. Madhya Pradesh, Rajasthan, Uttar Pradesh, Uttarakhand
 - e. Kerala, Tamil Nadu, Karnataka, Andhra Pradesh
196. Which are the states that come under Region 'C'?
- a. Assam, Meghalaya, Manipur, Mizoram, Nagaland, Arunachal Pradesh, Tripura**

- b. Gujarat, Maharashtra, Goa, Daman and Diu, Dadra and Nagar Haveli
 - c. Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand
 - d. Madhya Pradesh, Rajasthan, Uttar Pradesh, Uttarakhand
 - e. Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Telangana, Puducherry
197. Who is responsible for the compliance of provisions of the Official Languages Act and rules?
- a. Department of Official Language
 - b. Ministry of Home Affairs
 - c. **Union Government, State Governments, and Union Territory Administrations**
 - d. Parliament of India
198. Which Ministry takes important decisions pertaining to Official Language?
- a. Ministry of Education
 - b. Ministry of Culture
 - c. **Ministry of Home Affairs**
 - d. Ministry of Information and Broadcasting
199. According to Official Languages Rules, Tamilnadu falls under which region?
- a. Region A
 - b. Region B
 - c. **Region C**
 - d. Region D
200. According to Official Languages Rules, Andaman & Nicobar Islands fall under which region?
- a. Region A
 - b. **Region B**
 - c. Region C
 - d. Region D
201. Which are the Union Territories classified under Region "B"?
- a. Delhi, Chandigarh, Dadra and Nagar Haveli and Daman and Diu
 - b. **Andaman and Nicobar Islands, Puducherry**
 - c. Lakshadweep, Jammu and Kashmir, Ladakh

- d. None of the above
202. States in which Urdu has been declared as one of the Official Language?
- a. Bihar, Jharkhand, and West Bengal
 - b. Andhra Pradesh, Telangana, and Uttar Pradesh
 - c. **Andhra Pradesh, Telangana, Jharkhand, Bihar, and Uttar Pradesh**
 - d. Gujarat, Maharashtra, and Karnataka
203. Who was the Chairman of the First Official Language Commission?
- a. Jawaharlal Nehru
 - b. **B.G. Kher**
 - c. Rajendra Prasad
 - d. Morarji Desai
204. Who was the First Chairman of the Committee Which was formed on the recommendation of the Official Language Commission?
- a. Jawaharlal Nehru
 - b. Morarji Desai
 - c. **B.G. Kher**
 - d. Rajendra Prasad
205. Who was the First Chairman of the Parliamentary Committee on Official Language constituted in the year 1976?
- a. **Om Mehta**
 - b. Morarji Desai
 - c. B.G. Kher
 - d. Rajendra Prasad
206. Who chaired the First Railway Hindi Salahkar Samiti constituted in 1973?
- a. **Lalit Narayan Mishra**
 - b. Morarji Desai
 - c. B.G. Kher
 - d. Jagjivan Ram
207. As per the Constitution, who is translating the Statutory Rules, Regulations and Orders?
- a. The President of India

- b. The Union Government**
 - c. The State Governments
 - d. The Supreme Court of India
- 208. Which was the Main Language and Co-Official Language used for the Official Purpose of the Union of India up to 1965?
 - a. Hindi and English
 - b. Hindi (Main) and English (Co-Official)**
 - c. English and Hindi
 - d. Sanskrit and English
- 209. Which Committee of the Committee on Parliament on Official Language prepared the Draft?
 - a. First Committee
 - b. B) Second Committee
 - c. Third Committee (B.G. Kher Committee's recommendations led to formation of Committee under Morarji Desai)**
 - d. Fourth Committee
- 210. In which year the post of Hindi Assistant was created in Railway Board in compliance of President's order?
 - a. 1947
 - b. 1950
 - c. 1957**
 - d. 1965
- 211. In which year, Hindi (Parliament) Section was established in Railway Board?
 - a. 1960**
 - b. 1955
 - c. 1957
 - d. 1965
- 212. In which year, the Hindi Translation of Railway Budget was prepared and who was the Railway Minister?
 - a. 1955, Jawaharlal Nehru
 - b. 1956, Lal Bahadur Shastri**
 - c. 1960, Morarji Desai
 - d. 1965, Indira Gandhi
- 213. Angami is a language of Goa
 - a. Nagaland

- b. Assam**
 - c. Bihar
 - d. Manipur
- 214. How many languages and dialects are spoken by people all over the world?
 - a. 9000
 - b. 6000**
 - c. None
 - d. 4000
- 215. Committee on Official Language shall consist _____members of the council of States
 - a. Thirty**
 - b. Ten
 - c. Hundred
 - d. Twenty
- 216. Which of the following are the languages of Pondicherry?
 - a. Tamil, Telugu, Malayalam
 - b. French, English
 - c. All of the above**
 - d. None of the above
- 217. Highest speaking language in India after Hindi is
 - a. Bengali
 - b. Telugu**
 - c. Marathi
 - d. Tamil
- 218. The provisions related to official language of India can be amended by
 - a. Simple Majority
 - b. Special Majority
 - c. Presidential Order
 - d. Constitutional Amendment**
- 219. Lepcha is a language of
 - a. Sikkim**
 - b. Nagaland
 - c. Tripura
 - d. Andhra Pradesh
- 220. Name the language that is widely spoken by the people residing in Assam
 - a. Gujarati
 - b. Punjabi
 - c. .English

d. Assamese

221. Which one of the following languages is not spoken in Sikkim?
- a. Bhutia
 - b. None of these**
 - c. Lepcha
 - d. Punjabi
222. Sherdukpen is a language of
- a. Bihar
 - b. Haryana
 - c. Arunachal Pradesh**
 - d. West Bengal
223. What is the additional official language of Uttarakhand?
- a. Garhwal
 - b. Sanskrit**
 - c. Kumaoni
 - d. Hindi
224. Approximately, how many people speak Chinese language?
- a. 1 million
 - b. 1 billion**
 - c. 1 thousand
 - d. 1 lakh
225. LIPI/Script of Hindi Language is
- a. Sanskrit
 - b. Devanagari**
 - c. Urdu
 - d. Gurumukhi
226. In which language vande matram was written?
- a. Marathi
 - b. Bengali
 - c. Hindi
 - d. Sanskrit**
227. English is the official language of which one of the following Indian States ?
- a. Assam
 - b. Tripura
 - c. Nagaland**

- d. Manipur
228. Arrange languages in Ascending order of Highest Speaking Language:
- a. Spanish, English, Russian, Chinese
 - b. Bengali, French, English, Chinese
 - c. Arabic, English, Spanish, Chinese
 - d. Arabic, Spanish, English, Chinese**
229. When Haryana was formed in 1966, _____ was declared as the second official language of the State by Bansi Lal Govt
- a. Punjabi
 - b. Telugu
 - c. Tamil**
 - d. Hindi
230. Which one of the following languages is not widely spoken in Tripura?
- a. English
 - b. Bengali
 - c. Hindi
 - d. Tripuri**
231. Sanskrit is official language of the state
- a. Madhya Pradesh
 - b. Uttarakhand**
 - c. Himachal Pradesh
 - d. Karnataka
232. Apotanji is a language of
- a. Sikkim
 - b. West Bengal
 - c. Kerala
 - d. Arunachal Pradesh**
233. The language spoken in Lakshadweep islands is
- a. Marathi
 - b. Tamil
 - c. Malayalam**
 - d. Gujarati
234. While Hindi is the official language, English has been permitted for official use
- a. till 1995
 - b. till 2001

- c. till 2010
 - d. Indefinitely**
235. Which of the following is the official language of Jammu and Kashmir?
- a. Kannada, Malayalam and Telugu
 - b. Farsi, Urdu and Hindi
 - c. Urdu, Hindi and Kashmir**
 - d. Bengali, Hindi and English
236. The only religious book ever printed in a shorthand scripts is
- a. Bible**
 - b. Ramayan
 - c. Kuran
 - d. Geeta
237. The oldest Indian language is
- a. Tamil**
 - b. Telugu
 - c. Punjabi
 - d. Hindi
238. When was the first time 'World Hindi Day' is observed?
- a. 1975
 - b. 2006**
 - c. 2011
 - d. 2015
239. According to Annual Programme, in which order Advertisement (Tender Notice etc.) of Central Offices are to be published in News Papers?
- a. English, Hindi, Regional Language, Other Language**
 - b. Hindi, English, Regional Language, Other Language
 - c. Regional Language, Hindi, English, Other Language
 - d. other Language, Regional Language, Hindi, English
240. Konkani is the official language of _____.
- a. Andhra Pradesh
 - b. Arunachal Pradesh
 - c. West Bengal
 - d. Goa...**
241. Which of these languages is generally not spoken in Southern part of India?

- a. Telugu
 - b. Konkan...
 - c. Maithili**
 - d. Malayalam...
242. Urdu is the official language of .
- a. Andhra Pradesh
 - b. Arunachal Pradesh
 - c. West Bengal
 - d. Jammu kashmir**
243. Malayalam is the official language of
- a. Puducherry
 - b. Lakshadweep**
 - c. Daman and Diu
 - d. Delhi
244. Dzongkha is the official Language of
- a. Indonesia
 - b. Cambodia
 - c. Bhutan**
 - d. Myanmar.
245. Telugu is the official language of _____.
- a. Andhra Pradesh**
 - b. Arunachal Pradesh
 - c. Assam
 - d. Bihar
246. Ramcharitmanas is an epic poem written in which language?
- a. Santali
 - b. Munda
 - c. Awadhi**
 - d. Sanskrit
247. How many languages are officially recognized in India?
- a. 17
 - b. 19
 - c. 22**

- d. 10
248. Who among the following was the first grammarian of the Sanskrit language?
- Kalhana
 - Maitreyi
 - Kalidasa
 - Panini...**
249. Who will be the President of the Official Language Implementation Committee in the field offices? 'SELF LEARNING KIT' ON OFFICIAL LANGUAGE RULES & PROVISIONS
- Head of the Department**
 - Administrative Head of the Office
 - Any Group Officer
 - Any Branch Officer
250. Who will be the Member-Secretary of the Official Language Implementation Committee in the field offices?
- Head of the Department
 - Administrative Head of the Office
 - Any Group Officer
 - Hindi Officer**
251. Communications from a Central Government office to State or Union Territory in Region 'C' or to any office (not being a Central Government office) or person in such State shall be in
- English**
 - Hindi
 - Bilingual
 - the Language of State Concerned
252. Communications from a Central Government office to a State in Region 'A' or to any office (not being a Central Government office) or person shall (save in exceptional cases) be in
- English
 - Hindi**
 - Bilingual

- d. the Language of State Concerned
253. Communications from a Central Government office to any person in a State or Union Territory of Region 'B' may be in .
- a. English
 - b. Hindi
 - c. Either Hindi or English**
 - d. the Language of State Concerned
254. Communications from a Central Government office in Region 'C' to a State or Union Territory of Region 'A' or Region 'B' or to any office (not being a Central Government office) or person in such State may be in
- a. English
 - b. Either in Hindi or English**
 - c. Hindi
 - d. the Language of State Concerned
255. Communications from a Central Government office in reply to communications in Hindi shall be in
- a. English
 - b. Hindi**
 - c. Bilingual
 - d. the Language of State Concerned
256. All documents referred to in sub-section (3) of section 3 of the OL Act shall be in
- a. English
 - b. Hindi
 - c. Both Hindi & English**
 - d. the Language of State Concerned
257. 703)It shall be the responsibility of the persons..... to ensure the compliance of subsection (3) of section 3 of the OL Act 1963.
- a. (A) Signing such documents**
 - b. (B) Writing such documents
 - c. (C) Group Officer
 - d. (D) Hindi Officer

258. Where an employee desires any order or notice relating to service matters (including disciplinary proceedings) required to be served on him to be in Hindi, or as the case may be, in English, it shall be given to him in
- (A) English
 - (B) Both Hindi & English
 - (C) Hindi
 - (D) the desired Language**
259. Any Application, appeal or representation, when made or signed in Hindi, shall be replied to in
- English
 - Hindi**
 - Bilingual
 - The Language of State Concern
260. If any question arises as to whether a particular document is of a legal or technical nature, it shall be decided by the
- Head of the Department**
 - Group officer concerned
 - Branch Officer concerned
 - Hindi Officer
261. An employee shall be deemed to possess proficiency in Hindi if he has passed the Matriculation or any equivalent or higher examination with as the medium of examination.
- English
 - Hindi**
 - Urdu
 - The Language of State Concerned
262. An employee shall also be deemed to possess proficiency in Hindi if he has taken as an elective subject in the degree examination or any other examination equivalent to or higher than the degree examination.
- English
 - Hindi**
 - Urdu
 - The Language of State Concerned

263. An employee shall be deemed to have acquired a working knowledge of Hindi if he has passed the Matriculation or an equivalent or higher examination with as one of the subjects.
- a. English
 - b. Hindi**
 - c. Urdu
 - d. The Language of State Concerned
264. An employee shall also be deemed to have acquired a working knowledge of Hindi if he has passed the conducted under the Hindi Teaching Scheme of the Central Government.
- a. Pragya
 - b. Praveen
 - c. Prabodh
 - d. Pragya/Praveen/Prabodh exam specified by the Govt. as per Group A/B/C**
265. All manuals, codes and other procedural literature (printed or cyclostyled as the case may be) relating to Central Government offices shall be published in
- a. English
 - b. Hindi
 - c. Hindi & English
 - d. Hindi and English in diglot form**
266. The forms and headings of registers used in any Central Government office shall be in
- a. English
 - b. Hindi
 - c. Hindi & in English**
 - d. Hindi and English in diglot form
267. All name-plates, sign-boards, letter-heads and inscriptions on envelopes and other items of stationery written, printed or inscribed for use in any Central Government office, shall be in
- a. English
 - b. Hindi
 - c. Hindi & in English**
 - d. Hindi and English in diglot form

268. It shall be the responsibility of the of each Central Government office to ensure that the provisions of the OL Act and the OL Rules are properly complied with.
- Administrative Head of the Department**
 - Group officer concerned
 - Branch Officer
 - Hindi Officer
269. Notwithstanding anything contained in rules the Central Government may, by order specify the notified offices where Hindi alone shall be used for noting, drafting and for such other official purposes as may be specified in the order by employees who possess proficiency in Hindi.
- 8(1) of OL rules 1976
 - Rule 8(2) of OL rules 1976
 - 8(4) of OL rules 1976**
 - 8(3) of OL rules 1976
270. Union Territory of Andaman and Nicobar Islands is under
- Region 'A'**
 - Region 'B'
 - Region 'C'
 - Exempted from any Region limits
271. The provisions of section 6 and section 7 of the OL Act 1963 shall not apply to the State of
- Jammu and Kashmir**
 - Tamil Nadu
 - Nagaland
 - None
272. The names of the Central Government offices, the staff whereof have acquired a working knowledge of Hindi, shall be notified in the Official Gazette under rule
- 10(1) of OL rules 1976
 - Rule 10(2) of OL rules 1976
 - 10(3) of OL rules 1976
 - 10(4) of OL rules 1976**
273. might be co-opted as Member-Secretary to the Selection/Purchase Committee of the Libraries in the attached and subordinate offices.

- a. Branch Officer
- b. Group Officer
- c. Secretary
- d. **Hindi Officer**

274. The Central Government may, if it is considered necessary to do by general or special order exempt any Central Government office from all or any of the provisions of the of OL Rules 1976.

- a. **Rule 11**
- b. Rule 12
- c. Rule 10
- d. Rule 8

275. As per Section 2 (b) of OL Act 1963 'Hindi' means-

- a. Bhojpuri
- b. Khari Boli
- c. Saurshaini
- d. **Hindi in Devanagari Script**

276. The shall be used for purposes of communication between the Union and a State which has not adopted Hindi as its Official Language.

- a. **English language**
- b. Hindi language
- c. Urdu language
- d. Concerned State Language

277. From the given below which document is mandatory to be issued both in Hindi and English Language?

- a. **General Orders**
- b. Branch Orders
- c. Notes
- d. Letters issued to region area

278. The Committee on Official Language shall consist of

- a. 20 Members
- b. **30 Members**

- c. 40 Members
 - d. 50 Members
279. It shall be the duty of the Committee to review the progress made in the use of Hindi for the official purposes of the Union and submit a report to the making recommendations thereon.
- a. Minister of Home Affairs
 - b. Prime Minister
 - c. OL Department
 - d. President**
280. The Committee on Official Language shall consist of Members from Lok Sabha
- a. 10 Members
 - b. 15 Members
 - c. 20 Members**
 - d. 30 Members
281. The Committee on Official Language shall consist of Members from Rajya Sabha
- a. 10 Members**
 - b. 15 Members
 - c. 20 Members
 - d. 30 Members
282. The directions of the President on the report submitted by the Committee on Official Language shall not be inconsistent with the
- a. Section 3 of OL Act 1963**
 - b. OL Rules 1976
 - c. View of home Minister
 - d. View of Prime Minister
283. The Ministry of.....may provide an authorized Hindi translation of Parliamentary legislation.
- a. Home Affairs
 - b. Law**
 - c. Parliamentary Affairs

d. Personnel, Public Grievances and Pensions

284. “As the medium of examination of ‘All-India Services and higher Central Services’ both Hindi and English shall be available at the option of the candidate” This option has been given under the authority of
(A) Section 3 of OL Act 1963
(B) Rule 6 of OL Rules 1976
(C) **Para 9 of the President’s Orders 1960**
(D) Para 10 of the President’s Orders 1960
285. The Chairman of the Council of States or Speaker of the House of the People, or person acting as such, as the case may be, may permit any member who cannot adequately express himself in Hindi or in English to address the House in
(A) any Regional Language
(B) **his mother tongue**
(C) the Language of his State
(D) any foreign Language
286. 7‘The official language of the Union shall be Hindi in Devanagari Script’ is mentioned in
(A) Sec. 2 (b) of OL Act 1963
(B) OL Rules 1976
(C) the President’s Orders 1960
(D) **Article 343 (1) of the Constitution**
287. Which Section from following authorized the President to issue Orders 1960 on the report of Official Language Commission?
(A) OL Act
(B) Rule 6 of OL Rules
(C) The President himself being an Authority
(D) **Article 344 (6) of the Constitution**

288. Language provisions are mentioned in the Article in the Constitution of India.
- (A) 333 to 343
 - (B) 343 to 345
 - (C) 343 to 350
 - (D) 343 to 351**
289. Directive for development of the Hindi language are mentioned in the Article-
- (A) 343
 - (B) 345
 - (C) 351**
 - (D) 365
290. All the languages included in the Eighth Schedule to the Constitution and English shall be permitted as alternative media for the All India and higher Central Services examinations” is mentioned in the
- (A) Para 4(A) of the Official Language Resolution, 1968**
 - (B) Rule 3(1) of OL Rules 1976
 - (C) Section 3 (2) of OL Act 1963
 - (D) Article 350 of the Constitution of India
291. Compulsory knowledge of either Hindi or English shall be required at the stage of selection of candidates for recruitment to the Union services is mentioned in the
- (A) Para 4 (B) of the Official Language Resolution, 1968**
 - (B) Rule 3(1) of OL Rules 1976
 - (C) Section 3 (2) of OL Act 1963
 - (D) Article 350 of the Constitution of India
292. Which item from following authorizes the Ministry of Home Affairs for the preparation and implementation of annual programme that is concerned with preparatory measures for facilitating the progressive use of Hindi?
- (A) OL Act 1963
 - (B) OL Rules 1976
 - (C) The Ministry of Home Affairs itself being an Authority
 - (D) Para 14 of the President’s Order 1960 ‘**
293. The Eighth Schedule of the Constitution specifies major languages of India besides Hindi, and it is necessary in the interest of the educational and cultural

advancement of the country that concerted measures should be taken for the full development of these languages;

- a. (A) 14
- b. (B) 18
- c. **(C) 22**
- d. (D) 24

294. “In interview for recruitment, option of Hindi medium should be also available along with English” is mentioned in

- a. (A) Section 3(3) of OL Act 1963
- b. (B) Rule 6 of OL Rules 1976
- c. (C) Para 12 of the President’s Order 1960
- d. **(D) Presidential Orders on Para 22 (E) of the 3rd part of the Report of Committee of Parliament**

295. Which of the following provisions compels the Head of the Office to attend the Meeting of TOLIC

- a. (A) Section 9 of OL Act 1963
- b. (B) Para 10 of the President’s Order 1960
- c. **(C) Presidential Orders on Para 16.5 (i) of the 7th part of the Report of Committee of Parliament**
- d. (D) There is no compulsion to attend such meetings by the Head of the Offices

296. “The headings of the registers available in all the Govt. Offices and of the service books of all categories of officers and employees should be bilingual and the entries therein should be made in Hindi as far as possible” is mentioned in

- a. (A) Section 3 of OL Act 1963
- b. (B) The President’s Order 1960
- c. **(C) Presidential Orders on the 4th part of the Report of Committee of Parliament**
- d. (D) There is no compulsion to follow the above in the region ‘C’ Offices

297. Which of the following is true for variable names in C?

- a. a) They can contain alphanumeric characters as well as special characters
 - b. b) It is not an error to declare a variable to be one of the keywords (like goto, static
 - c. **c) Variable names cannot start with a digit**
 - d. d) Variable can be of any length
- 148) Which is valid C expression?

298. The Government of India has instituted an award for the original writing of books in Hindi by its (including retired) employees.
- a. (a) Maithilisharan Gupta Award Scheme
 - b. (b) Rajbhasha Gaurav Award Scheme**
 - c. (c) Premchand Award Scheme
 - d. (d) Railway Minister's Award Scheme
299. How many training courses are prescribed for language training of central government employees?
- a. (a) Two
 - b. (b) Three
 - c. (c) Four**
 - d. (d) Five
300. Regarding the use of language of which institution is provided for in Article 343 of the Constitution?
- a. (a) Legislature
 - b. (b) Legislative Assembly
 - c. (C) Legislative**
 - d. (d) Supreme Court
301. Which of the following cannot be a variable name in C?
- a. a) volatile**
 - b. b) true
 - c. c) friend
 - d. d) export
302. We should keep our savings with banks because
- a. a) It is safe
 - b. b) Earns interest**
 - c. c) Can be withdrawn anytime
 - d. d) All of above
303. Bank does not give loan against
- a. a) Gold Ornaments
 - b. b) LIC policy
 - c. c) Lottery ticket**
 - d. d) NSC
304. Bank having maximum number of branches in India

- a. **a) Reserve Bank of India**
 - b. b) State Bank of India
 - c. c) Punjab National Bank
 - d. d) Bank of Baroda
305. ATM password should be kept in
- a. a) Personal diary
 - b. b) Office diary
 - c. **c) Memory**
 - d. d) All of above
306. ATM password to be shared only with
- a. a) Spouse
 - b. b) Obedient son
 - c. c) Obedient daughter
 - d. **d) None of above**
307. Nomination can be done in
- a. a) Savings Bank account
 - b. b) Recurring Deposit account
 - c. c) Fixed Deposit account
 - d. **d) All of above**
308. ATM means
- a. a) Any Time Money
 - b. b) Auto Truck of Mahindra
 - c. **c) Automated Teller Machine**
 - d. d) None of above

309. Timely repayment of loans results
- a. a) Good reputation
 - b. b) No tension
 - c. c) Easily availability of loan in future
 - d. **d) All of above**
310. Defaulter of loan means
- a. **a) Not paying loan instalments**
 - b. b) Bad reputation
 - c. c) Illegal activities
 - d. d) None of above
311. Life insurance means
- a. a) Insurance of human
 - b. **b) Insurance of life of human and Cattle**
 - c. c) Insurance of Life of Machines
 - d. d) All of above
312. General Insurance relates to insurance against
- a. a) Fire
 - b. b) Theft
 - c. c) Burglary
 - d. **d) All of above**
313. Aadhaar is
- a. a) 12 digit number card
 - b. **b) Identity proof issued by UIDAI**
 - c. c) Both (a) & (b)
 - d. d) None of above
314. E or S means
- a. a) East or South zone
 - b. b) Easy and Swift
 - c. **c) Either or Survivor**
 - d. d) None of above
315. Which is prohibited for writing on currency notes?
- a. a) Political message
 - b. b) Religious message
 - c. c) Personal message

d. d) All of above

316. PPF means
- a. a) Pension Planning Funds
 - b. b) Person having Pension Facilities
 - c. c) Public Provident Fund**
 - d. d) Permanent Practitioner's Forum
317. How many employees/officers are awarded under Railway Board's Rajbhasha Individual Cash Award Scheme from Zonal Railway every year?
- a. A) Five**
 - b. B) Three
 - c. C) Two
 - d. D) seven
318. What is the amount of prize money given under the Rajbhasha Individual Cash Award Scheme?
- a. A) 1800
 - b. B) 1250
 - c. C) 1400
 - d. D) 1500**
319. How many prizes are given under the Collective Cash Award Scheme for doing official work in Hindi?
- a. A) Three**
 - b. B) Two
 - c. C) One
 - d. D) Five
320. Who is the Chairman of Central Hindi Samiti (Committee)?
- a. A) Prime Minister**
 - b. B) Home Minister
 - c. C) Education Minister
 - d. D) Minister of State for Home Affairs
321. The Central Hindi Samiti (Committee) comes under which Ministry?
- a. a) Ministry of Home Affairs**
 - b. b) Ministry of Education
 - c. c) Ministry of Culture

- d. d) Ministry of Information and Broadcasting
322. After Independence, initially which Ministry was entrusted the duty of training Central Government Staff in Hindi?
- a. A) Ministry of Home Affairs
 - b. B) Ministry of Education**
 - c. C) Ministry of Labour and Employment
 - d. D) Ministry of Personnel, Public Grievances and Pension
323. Which committee review the progress made in the propagation of Hindi in a particular Ministry/Department?
- a. A) Official Language Committee
 - b. B) Hindi Advisory Committee**
 - c. C) Central Hindi Committee
 - d. D) Parliamentary Committee
324. When was the Parliamentary Committee on Official Language constituted?
- a. A) 1955
 - b. B) 1965
 - c. C) 1975**
 - d. D) 1985
325. How many members are there in the Parliamentary Committee on Official Language?
- a. A) 20
 - b. B) 25
 - c. C) 30**
 - d. D) 35
326. How many Lok Sabha members are there in the Parliamentary Committee on Official Language?
- a. A) 20 members**
 - b. B) 25 members
 - c. C) 30 members
 - d. D) 35 members
327. At present, how many Sub-Committees are there in the Parliamentary Committee on Official Language?
- a. A) 3 Sub committees
 - b. B) 6 Sub committees**
 - c. C) 2 Sub committees

- d. D)1 Sub committees
328. Which Sub-Committee of Parliamentary Committee on Official Language, inspects the offices of Railway Ministry?
- a. A) 1st Sub committees
 - b. B) 7th Sub committees
 - c. C) 3rd Sub-Committee
 - d. **D) 2nd Sub-Committee**
329. What is the expansion for OLIC used by Dept. of Official Language?
- a. A) Official Language Inspection Committee
 - b. **B) Official Language Implementation Committee**
 - c. C) Official Language Improvement Committee
 - d. D) Official Language Investigation Committee
330. What is the main duty of Official Language Implementation Committee?
- a. A) To promote English language
 - b. **B) To inspect offices for official language implementation**
 - c. C) To translate all documents into regional languages
 - d. D) To conduct Hindi language courses
331. Who is the Chairman of the Divisional Official Language Implementation Committee?
- a. **A) Divisional Railway Manager**
 - b. B) District Magistrate
 - c. C) Senior Superintendent of Post Office
 - d. D) All India level officers
332. Who is the Chairman of the Zonal Official Language Implementation Committee?
- a. **A) General Manager**
 - b. B) Chief Minister
 - c. C) Home Minister
 - d. D) Prime Minister
333. Who is made as the Chairman of the Town Official Language Implementation Committee Constituted? in major cities?
- a. A) District Magistrate
 - b. B) Senior Superintendent of Police
 - c. C) Commissioner/Deputy Commissioner

d. D) Municipal Commissioner

334. In which year did the Constituent Assembly accept Hindi as the official language of independent India?
- a. (a) January 26, 1950
 - b. (b) August 15, 1947
 - c. (c) August 9, 1972
 - d. (d) September 17, 1979**
335. In which year was the Official Languages Act created?
- a. (a) January 15, 1963
 - b. (b) April 10, 1965
 - c. (c) May 10, 1963**
 - d. (d) June 13, 1967
336. The amendment to the Official Languages Act, 96 occurred in which year?
- a. (a) 1961**
 - b. (b) 1967
 - c. (c) 1965
 - d. (d) 1966
337. Who is the chairman of the Parliamentary Official Language Committee?
- (a) Minister of Finance
 - (b) Minister of Agriculture
 - (c) Minister of Railways
 - (d) Minister of Home Affairs**
338. How many sub-committees does the Parliamentary Official Language Committee have?
- (a) 01 sub-committee
 - (b) 02 sub-committees
 - (c) 03 sub-committees**
 - (d) 07 sub-committees
339. In which year was the first amendment made to the Official Language Rules, 1976?
- (a) 1980**
 - (b) 1988
 - (c) 1989
 - (d) 1990

340. How many sections are there in the Official Languages Act, 1963?

- (a) 08
- (b) 09**
- (c) 10
- (d) 11

SECTION - B

I. ELECTRICAL CIRCUITS

341. Two incandescent light bulbs of 40 W and 60 W rating are connected in series across the mains. Then

- a. The bulbs together consume 100 W
- b. The bulbs together consume 50 W
- c. The 60 W bulb glows brighter
- d. The 40 W bulb glows brighter

Ans: (d)

342. Two resistances are connected in parallel and each dissipates 40 W. The total power supplied by the source is equals to

- a. 80 W
- b. 40 W
- c. 160 W
- d. 20 W

Ans: (a)

343. Three equal resistors, connected in series across a source of emf, dissipated 10W of power. What would be the power dissipated in the same resistor when they are connected in parallel across the same source?

- a. 10W
- b. 30W
- c. 90W
- d. 270W

Ans: (c)

344. 150 resistor and the combination in series with a 120 resistor. The equivalent resistance of the circuit is:

- a. $37\ \Omega$
- b. $27\ \Omega$
- c. $18\ \Omega$
- d. None of these

Ans: (c)

345. The energy used by a 1.5kW heater in 5 minutes is:

- (a) 450000 J
- (b) 450 J
- (c) 7500 J
- (d) None of these

Ans: (a)

346. What is called the Electro-Motive Force (EMF) of a voltage source?

- a. Terminal voltage when load is applied
- b. Internal voltage when no load is applied
- c. Product of internal resistance and load current
- d. Electric pressure provided to the load

Ans: (b)

347. One coulomb of electrical charge is contributed by how many electrons?

- a. 0.625×10^{19}
- b. 1.6×10^{19}
- c. 10^{19}

(d) None of these

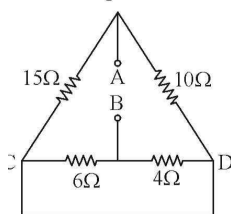
Ans: (a)

348. It is known that two 20, 2W resistors are connected in parallel. Find the combined resistance and wattage rating.

- a. 2Ω , 4W
- b. 1Ω , 4W
- c. 1Ω , 2W
- d. 2Ω , 2W

Ans: (b)

349. In the following circuit, determine the equivalent resistance between points A and B.



- a. 8.4Ω
- b. 4Ω
- c. 2.5Ω
- d. 6.8Ω

Ans: (a)

350. If 10 lamps are connected in series across a power supply, then determine the voltage of the supply when it is given that the voltage across each lamp is 6.0 V.

- a. 60 V
- b. 35 V
- c. 20 V
- d. 42 V

Ans: (a)

351. Current in a circuit is measured using a simple slide wire. What will be the voltage drop per unit length. If the standard cell is of emf 2.38 V balanced at length of 35 cm.

- a. 0.68 V/cm
- b. 0.068 V/cm
- c. 68 V/cm
- d. 6.8 V/cm

Ans: (b)

352. The element which is capable of delivering energy by its own is known as:

- a. Non-linear element
- b. Unilateral element
- c. Active element
- d. Passive element

Ans: c

353. remains the same in all parts of a series circuit.

- a. Current
- b. Resistance
- c. Voltage
- d. Power

Ans: (a)

354. Resistivity of a wire depends upon

- a. Material
- b. Area
- c. Length
- d. All of these

Ans: (a)

355. A charge of 0.1 coulomb moves through a given point every 0.05 seconds. The current flowing through the point is

- a. 2 mA
- b. 5 mA
- c. 2 A
- d. 5 A

Ans: (c)

356. A 220 V, 200 W bulb and a 220 V, 100 W bulb are connected in series across a 220 V supply, the power consumed by them will be
- a. 33.3 W
 - b. 66.6 W
 - c. 100 W
 - d. 300 W

Ans: (b)

357. A 2.2 m long conductor has a cross sectional area of 0.025 m² and resistance of 5 ohms, find its resistivity.
- a. 0.072 ohm m
 - b. 0.057 ohm m
 - c. 0.58 ohm m
 - d. 0.67 ohm m

Ans: (b)

358. What will be the largest number of 100 W electric light bulbs which can be operated from a 200V supply fitted with a 13A fuse?
- a. 16
 - b. 26
 - c. 31
 - d. 32

Ans: (b)

359. is the property of conductor which is opposite to the property that opposes flow of current.
- a. Conductance
 - b. Resistance
 - c. Reluctance
 - d. Inductance

Ans: (a)

360. If the diameter D of a conductor is doubled, its resistance R will be reduced to
- a. $\frac{1}{4}$ R
 - b. 16 R
 - c. $\frac{1}{16}$ R
 - d. No change

Ans: (a)

361. A nickel coil has a resistance of 16 Ω at 50°C. If the temperature coefficient of resistance at 0°C is 0.003/°C, the resistance at 0°C is: (approx)
- a. 16.9 Ω
 - b. 14 Ω
 - c. 23.3 Ω
 - d. 15.5 Ω

Ans: (b)

362. One coulomb-per-second is equal to one --.

- a. Watt
- b. Joule
- c. Volt
- d. Ampere

Ans: (d)

363. The capacitance of a variable air capacitor is maximum when

- a. The movable plates half overlap the fixed plates
- b. The movable plates are most widely separated from the fixed plates
- c. Both sets of plates are exactly meshed.
- d. The movable plates are closer to one side of the fixed plate than to the other.

Ans: (c)

364. Electrical voltage is also known as:

- a. Electric pressure
- b. Energy
- c. Watt
- d. Unit

Ans: (a)

365. The length of wire having resistance of 1 ohm/m in a heater rated at 1000 W and 250 V will be

- a. 62.8 mm
- b. 26.5 m
- c. 62.5 m
- d. 1.5 m

Ans: (c)

366. Calculate the resistance of 1 km long copper wire of radius 1 mm. (If resistivity of copper = 1.72×10^{-8})

- (a) 5.5 Ω
- (b) 6.5 Ω
- (c) 4.5 Ω
- (d) 6.75 Ω

Ans: (a)

367. How is the voltage determined when the current and resistance are given?

- (a) Divide the current by the resistance
- (b) Subtract the current from the resistance
- (c) Multiply the current and resistance
- (d) Add the current and the resistance

Ans: (c)

368. Here two threads B and C have the same cross-section and are made of the same material. $R_b=500\Omega$ and $R_c=100\Omega$. The number of times B is longer than C is -----

- (a) 1
- (b) 5
- (c) 4
- (d) 3

Ans: (b)

369. The number of nodal equation in the nodal analysis of a linear circuit having 4 nodes will be

- (a) 6
- (b) 5
- (c) 3
- (d) 4

Ans: (c)

370. What is the total resistance of a series circuit and parallel circuit respectively for resistors $R_1 = 2$ ohms, $R_2 = 4$ ohms and $R_3 = 1$ ohm?

- (a) 1.75, 7
- (b) 7, 1.5
- (c) 7, 0.571
- (d) 7, 7

Ans:(c)

371. The average power consumed in purely inductive circuit is:-

- (a) 0.25
- (b) 0
- (c) 0.5
- (d) 1

Ans: (b)

372. In a DC circuit, which of the following components is used to reduce the voltage?

- (a) Resistor
- (b) Inductor
- (c) Reactor
- (d) Capacitor

Ans: (a)

373. The law of electromagnetic induction is also called

- (a) Joule's law
- (b) Faraday's law
- (c) Coulomb's law
- (d) Ohm's law

Ans: (b)

374. Which of the following correctly defines Power?

- (a) Energy
- (b) kWh
- (c) The rate at which energy is used
- (d) The rate at which energy is generated

Ans: (c)

375. The property of a substance which opposes the flow of current is known as

- (a) Conductance
- (b) Reluctance
- (c) Resistance
- (d) Admittance

Ans: (c)

376. Three equal resistances when combined in series total power loss is 90 W. Their power loss when combined in parallel will be

- (a) 270 W
- (b) 30 W
- (c) 810 W
- (d) 10 W

Ans: (c)

377. The property of a conductor due to which it passes current is called

- (a) Resistance
- (b) Reluctance
- (c) Conductance
- (d) Inductance

Ans: (c)

378. The resistance of a conductor varies inversely as

- (a) Length
- (b) Area of cross-section
- (c) Temperature
- (d) Resistivity

Ans: (b)

379. With rise in temperature the resistance of pure metals

- (a) Increases
- (b) Decreases
- (c) First increases and then decreases
- (d) Remains constant

Ans: (a)

380. Three resistances of 10 Ohms, 15 Ohms and 30 Ohms are connected in parallel. The total resistance of the combination is

- (a) 5 ohms
- (b) 10 ohms
- (c) 15 ohms
- (d) 55 ohms

Ans: (a)

381. In a circuit a 33 Ohm resistor carries a current flow of current known as of 2A. The voltage across the resistor is

- (a) 33 V
- (b) 66 V
- (c) 80 V
- (d) 132 V

Ans: (b)

382. A light bulb draws 300 mA when the voltage across it is 240 V The resistance of the light bulb is

- (a) 400 Ohms
- (b) 600 Ohms
- (c) 800 Ohms
- (d) 1000 Ohms

Ans: (c)

383. Two resistors are not said to be connected in series when

- (a) Same current passes in turn through both
- (b) Both carry the same value of current
- (c) Total current equals the sum of branch currents
- (d) Sum of IR drops equals the applied e.m.f.

Ans: (c)

384. Which of the following statements is true both for a series and a parallel D.C. circuit?

- (a) Elements have individual currents
- (b) Currents are additive
- (c) Voltages are additive
- (d) Powers are additive

Ans: (d)

385. If the energy is supplied from a source, whose resistance is 1 Ohm, to a load of 100 Ohms the source will be

- (a) A voltage source
- (b) A current source
- (c) Both of above
- (d) None of the above

Ans: (a)

386. The circuit whose properties are same in either direction is known as

- (a) Unilateral circuit
- (b) Bilateral circuit
- (c) Irreversible circuit
- (d) Reversible circuit

Ans: (b)

387. The number of independent equations to solve a network is equal to

- (a) The number of chords
- (b) The number of branches
- (c) Sum of the number of branches and chords
- (d) Sum of number of branches, chords and nodes

Ans: (a)

388. Siemens is a unit for measuring

- (a) Resistance
- (b) Flux density
- (c) Conductance
- (d) Electric field

Ans: (c)

389. What is the equivalent resistance of one limb A when delta connection is transformed into star?

- (a) $R_1 R_3 / (R_1 + R_2 + R_3)$
- (b) $R_2 R_3 / (R_1 - R_2 + R_3)$
- (c) $R_1 R_2 R_3 / (R_1 + R_2 + R_3)$
- (d) $R_1 + R_2 + R_3$

Ans: a)

390. A linear circuit contains ideal resistors and ideal voltage source. If values of all the resistors are halved then voltage across each resistor becomes.

- (a) Halved
- (b) Doubled
- (c) Remained unchanged
- (d) Decreased by 4 times

Ans: (c)

391. A star circuit has each branch resistance of $R/2$. The equivalent delta each branch resistance will be:

- (a) $R/6$
- (b) $3 R/2$
- (c) $2 R$
- (d) $4 R$

Ans: (b)

392. An electric circuit with 10 branches and 7 nodes will have:

- (a) 4 loop equation
- (b) 7 loop equation
- (c) 10 loop equations
- (d) 5 loop equations

Ans: (a)

393. In terms of ABCD parameters, a two port network is symmetrical if and only if

- (a) $A = B$
- (c) $C = D$
- (b) $B = C$
- (d) $D = A$

Ans: (d)

394. Network which contain one or more than one source of emf is known as

- (a) Active Network
- (b) Passive Network
- (c) Electric network
- (d) None of these

Ans: (a)

395. Delta/star or star/delta transformation technique is applied to :

- (a) One terminal network
- (b) Two terminal network
- (c) Three terminal network
- (d) None of these

Ans: (c)

396. In a parallel circuit all components must ____

- (a) Have same potential difference across them
- (b) Have the same value
- (c) Carry the same current
- (d) All of the above

Ans: (a)

397. A Student connects four cells each of emf 2 V and internal resistance 0.5 Ω . In series but the one cell has its terminal reversed. Now the current in parallelly connected 2 Ω resistor-

- (a) zero
- (b) 1 A
- (c) 1.5 A
- (d) 2 A

Ans: (b)

398. High pass T Filter has
- (a) Low input impedance at low frequencies
 - (b) High input impedance at high frequencies
 - (c) High output impedance at low frequencies
 - (d) Low input impedance at high frequencies
- Ans: (d)**
399. A network having a battery source in one of its arms is termed as -----
- (a) Lienar, network
 - (b) bilateral network
 - (c) active network
 - (d) passive network
- Ans: (c)**
400. Two resistances R and 2R are connected in parallel in an electric circuit. The thermal energy developed in R and 2R are in the ratio
- (a) 1:2
 - (b) 2:1
 - (c) 1:4
 - (d) 4:1
- Ans: (b)**
401. Two resistance R₁ and R₂ are connected in series R₁ = 528 ± 5Ω and R₂ = 325 ± 3Ω. The total resistance will be -
- (a) 853 ± 2Ω
 - (b) 853 ± 5Ω
 - (c) 853 ± 3Ω
 - (d) 853 ± 8Ω
- Ans: (d)**
402. Potential difference across a 0.04 F capacitance is 4 V Charge stored in it will be :
- (a) 0.1 C
 - (b) 2.1 C
 - (c) 0.16 C
 - (d) 0.016 C
- Ans: (c)**
403. A capacitor dissipates
- (a) no energy
 - (b) 10% of the stored energy
 - (c) 20% of the stored energy
 - (d) 50 % of the stored energy
- Ans: (a)**

404. A charge of $5\ \mu\text{C}$ passes through a circuit element during a particular interval of time, that is in 10ms duration. Determine the average current in this element during that interval of time:

- (a) $50\ \mu\text{A}$
- (b) $50\ \text{mA}$
- (c) $50\ \text{nA}$
- (d) $0.5\ \text{mA}$

Ans: (d)

405. Two $10\ \mu\text{F}$ capacitors are connected in parallel. What is the equivalent capacitor value ?

- (a) $25\ \mu\text{F}$
- (b) $40\ \mu\text{F}$
- (c) $5\ \mu\text{F}$
- (d) $20\ \mu\text{F}$

Ans: (d)

406. If a capacitor stores $100\ \mu\text{C}$ charge at 10 volts, the capacitance value is:

- (a) $100\ \mu\text{F}$
- (b) $1000\ \mu\text{F}$
- (c) $10\ \mu\text{F}$
- (d) $1\ \mu\text{F}$

Ans: (c)

407. During charging of a capacitor of $C = 100\ \mu\text{F}$ through a resistance of $1\ \text{k}\Omega$ applied with $100\ \text{V}$, the voltage at one time constant is -----

- (a) $36.7\ \text{V}$
- (b) $63.2\ \text{V}$
- (c) $100\ \text{V}$
- (d) $63.7\ \text{V}$

Ans: (b)

408. For power factor improvement the amount of capacitance required for star connected capacitor bank is:

- (a) Three times less than delta connected banks
- (b) Half of the delta connected banks
- (c) Equal to delta connected banks
- (d) Three times more than delta connected banks

Ans: (d)

409. A variable capacitor is one whose capacitance:

- (a) Changes with time
- (b) Changes with temperature
- (c) Changes with voltage
- (d) Can be changed

Ans: (d)

410. If an uncharged capacitor is connected to an energy source then-
- (a) The capacitor acts as an open circuit
 - (b) Current will start flowing in the capacitor in due course of time
 - (c) Current will flow instantaneously
 - (d) None of these

Ans: (c)

411. Two capacitors of equal value, $1\ \mu\text{F}$, are connected in parallel. The effective capacitance of this combination would be
- (a) $2\ \mu\text{F}$
 - (b) $0.5\ \mu\text{F}$
 - (c) $4\ \mu\text{F}$
 - (d) $0.25\ \mu\text{F}$

Ans: (a)

412. A voltage source (V) is connected across a capacitor (C) through a switch to form a circuit. At the instant the switch is closed -
- (a) An infinite current flows through the capacitor C after some time
 - (b) An infinite current flows through the capacitor C instantaneously
 - (c) No current will flow through the capacitor but a voltage V will appear across the capacitor
 - (d) None of these

Ans: (b)

413. If three capacitors C_1 , C_2 and C_3 of values of $1\ \mu\text{F}$, $2\ \mu\text{F}$ and $4\ \mu\text{F}$ respectively are in series and connected across a potential of $230\ \text{V}$, then total charge on all series capacitor is :
- (a) $110 \times 10^{-6}\ \text{C}$
 - (b) $121 \times 10^{-6}\ \text{C}$
 - (c) $131 \times 10^{-6}\ \text{C}$
 - (d) $61 \times 10^{-6}\ \text{C}$

Ans: (c)

414. A capacitor opposes:
- (a) Change in current
 - (b) Change in voltage
 - (c) Both change in current and voltage
 - (d) None of these

Ans: (b)

415. Two capacitors of capacitances $3\mu\text{F}$ and $6\mu\text{F}$ in series will have a total capacitance of :
- (a) $9\mu\text{F}$
 - (b) $2\mu\text{F}$
 - (c) $18\mu\text{F}$
 - (d) $24\mu\text{F}$

Ans: (b)

416. The maximum energy (W) stored in a capacitive circuit is: (Where C = capacitance of the circuit and E = potential applied)
- (a) $W = CE^2$
 - (b) $W = C^2E$
 - (c) $W = 1/2 (CE^2)$
 - (d) $1/2 (C^2E)$

Ans: (c)

417. An electrolyte capacitor can be used for:
- (a) DC only
 - (b) AC only
 - (c) Both
 - (d) None

Ans: (a)

418. The capacitance of a parallel plate capacitor is not affected by:
- (a) Thickness of conduction plates
 - (b) Area of the conducting plates
 - (c) Distance separating the plates
 - (d) Nature of the dielectric between the plates

Ans: (a)

419. The electrical capacitance is analogous of
- (a) Fluid flow
 - (b) Thermal resistance
 - (c) Inertia
 - (d) Spring

Ans: (d)

420. A capacitor is charged by constant current of 2 mA and results in a voltage increase of 12V at 10 sec interval. The value of capacitance is
- (a) 0.75 milli Farad
 - (b) 24 milli Farad
 - (c) 12 milli Farad
 - (d) 1.67 milli Farad

Ans: (d)

421. Two capacitors of $2\ \mu\text{F}$ and $3\ \mu\text{F}$ are connected in series across $1\ \text{OV}$. The potential difference across the $2\ \mu\text{F}$ capacitor will be:

- (a) $4\ \text{V}$
- (b) $6\ \text{V}$
- (c) $10\ \text{V}$
- (d) $0\ \text{V}$

Ans: (b)

422. A battery of $40\ \text{V}$ and three capacitor of $1000\ \text{mF}$, $500\ \text{mF}$, and $100\ \text{mF}$ are all connected in (I) parallel and (II) series. The ratio of total charge stored in case (I) that in case (II) is approximately

- (a) $3:64$
- (b) $64:3$
- (c) $160:3$
- (d) $104:5$

Ans: (d)

423. A capacitor capable of storing $1\ \text{J}$ of energy at $100\ \text{V}$ DC supply. The value of capacitance will be?

- (a) $100\ \mu\text{F}$
- (b) $200\ \mu\text{F}$
- (c) $50\ \mu\text{F}$
- (d) $400\ \mu\text{F}$

Ans: (b)

424. An air-filled parallel plate capacitor made of square plates, each $10\ \text{cm} \times 10\ \text{cm}$, has a capacitance C . If the plates are reduced to $2.5\ \text{cm} \times 2.5\ \text{cm}$, what would be the new capacitance?

- (a) $C/4$
- (b) $C/8$
- (c) $C/16$
- (d) $C/32$

Ans: (c)

425. A coil would behave as -----

- (a) An inductor at high frequencies
- (b) A capacitor at very low frequencies
- (c) A resistor at high frequencies
- (d) A capacitor at very high frequencies

Ans: (d)

426. Power factor of a circuit can be improved by the use of:

- (a) Choke coil
- (b) Capacitor
- (c) Induction motor
- (d) None of these

Ans: (b)

427. A circuit component that opposes the change in circuit voltage is

- (a) Resistance
- (b) Capacitance
- (c) Inductance
- (d) All of these

Ans: (b)

428. Capacitance, Voltage and Charge are related as

- (a) $Q = CV$
- (b) $C = QV$
- (c) $V = QC$
- (d) None of these

Ans: (a)

429. If four 80 micro farad capacitors are connected in series, the net capacitance is -----

- (a) 20 μF
- (b) 40 μF
- (c) 160 μF
- (d) 320 μF

Ans: (a)

430. The energy required to charge a 10 F capacitor to 100 Vis

- (a) 0.10 J
- (b) $5 \times 10^4 \text{ J}$
- (c) $5 \times 10^{-9} \text{ J}$
- (d) $10 \times 10^{-9} \text{ J}$

Ans: (b)

431. Capacitance of a capacitor

- (a) Increases with increases in overlapping area of plates
- (b) Increases with increases in relative permittivity of the dielectric
- (c) Increases with decreases in distance between the plates
- (d) All of the above

Ans: (d)

432. Two capacitors of 2 F each are connected in series to a 1 V battery. The total charge supplied by the battery to capacitors is

- (a) 1 C
- (b) 2 C
- (c) 0.5 C
- (d) 0.25 C

Ans: (a)

433. Capacitors used for improvement of power factor of a system because capacitor -----

- (a) Draws lagging power and supply leading power
- (b) Draws lagging power and supply lagging power
- (c) Draws leading power and supply lagging power
- (d) Draws leading power and supply leading power

Ans: (c)

434. The unit of dielectric strength is given by

- (a) V/m
- (b) V^2/m
- (c) m/V
- (d) m/V^2

Ans: (a)

435. A capacitor stores energy in -----

- (a) Electric field
- (b) Electromagnetic
- (c) Magnetic field
- (d) Dielectric dipole

Ans: (a)

436. Power factor in an industry can be improved by:

- (a) Transformer
- (b) Capacitor
- (c) Inductor
- (d) Stabilizer

Ans: (b)

437. The power factor of a pure capacitive circuit is:

- (a) maximum
- (b) unity
- (c) 0.8 leading
- (d) Zero

Ans: (d)

438. A circuit requires a capacitor of 100 μF , 25V The capacitor can be:

- (a) Paper capacitor
- (b) Electrolytic capacitor
- (c) Ceramic capacitor
- (d) Any type of capacitor

Ans: (b)

439. The total capacitance of two 40 μF series connected capacitors in parallel with a 4 μF capacitor is

- (a) 3.8 μF
- (b) 5 μF
- (c) 24 μF
- (d) 44 μF

Ans: (c)

440. With a fixed value capacitor C and variable voltage V across it, the energy stored in the capacitor is.

- (a) CV^2
- (b) $0.5CV^2$
- (c) $2CV^2$
- (d) CV

Ans: (b)

441. In capacitor circuit, the current leads the voltage by an angle ϕ the loss angle of the same capacitor will be

- (a) ϕ
- (b) $(90-\phi)$
- (c) $(90+\phi)$
- (d) None

Ans: (b)

442. When two capacitors are connected in series, there total value of capacitance -

- (a) Remains same
- (b) Reduces
- (c) Increases
- (d) None of these

Ans: (b)

443. Two capacitor C1 and C2 have $C_1=20\mu\text{F}$ and $C_2= 30\mu\text{F}$, are connected in parallel across a 100V source. The net capacitance of the circuit is?

- (a) 50 μF
- (b) 10 μF
- (c) 12 μF
- (d) 60 μF

Ans: (a)

444. Which of the following capacitors are used in D.C. circuits?

- (a) Mica
- (b) Air
- (c) Ceramic
- (d) Electrolytic

Ans: (d)

445. If three $15\ \mu\text{F}$ capacitors are connected in series, the net capacitance is

- (a) $5\ \mu\text{F}$
- (c) $50\ \mu\text{F}$
- (b) $40\ \mu\text{F}$
- (d) $30\ \mu\text{F}$

Ans: (a)

446. If distance between two plates of a parallel plate capacitor is half, the capacitance:

- (a) Doubles
- (b) Quintuples
- (c) Is halved
- (d) Remains the same

Ans: (a)

447. Potential applied across a 2F capacitor is 10 V . Energy stored will be:

- (a) 200 J
- (b) 100 J
- (c) 20 J
- (d) 10 J

Ans: (b)

448. A capacitor C at time $t=0$ with initial charge Q_0 acts as

- (a) Short circuit
- (b) Open circuit
- (c) Current source
- (d) Voltage source

Ans: (d)

449. Which of the following materials has the maximum dielectric strength?

- (a) Porcelain
- (b) Glass
- (c) Polystyrene
- (d) Soft rubber

Ans: (a)

450. The reactance of capacitors increases, when:

- (a) Applied voltage increases
- (b) AC frequency increases
- (c) Applied voltage decreases
- (d) AC frequency decreases

Ans: (d)

451. If a capacitance is charged by a square wave current source, then the voltage across the capacitor will be

- (a) Square wave
- (b) Step function
- (c) Triangular wave
- (d) Zero

Ans: (c)

452. The potential difference across a 20 μF capacitor to charge it with 100 mC is

- (a) 10 V
- (b) 10 kV
- (c) 5 V
- (d) 5 kV

Ans: (d)

453. Which of the following statements is correct about capacitors?

- (a) The capacitor open circuit in direct current (DC) circuits and short circuit in alternating current (AC) circuits
- (b) The capacitor short circuit in direct current (DC) circuits and open circuit in alternating current (AC) circuits
- (c) The capacitor disconnects short circuit in both direct current (DC) and alternating current (AC) circuits
- (d) None of these

Ans: (a)

454. Which of the following type of material is used between the plates of a capacitor?

- (a) Insulation material
- (b) Conductive material
- (c) Dielectric material
- (d) All the above

Ans: (c)

455. Which of the following is true for 3.9 k resistor using color-coding technique?

- (a) Red, white, red, gold
- (b) Red, green, orange, silver
- (c) Orange, green, orange, silver
- (d) Orange, white, red, gold

Ans: (d)

456. Which of the following is the correct formula of specific resistance?

- (a) R/L
- (b) RL/A
- (c) RA/L
- (d) A/RL

Ans: (c)

457. Kirchhoff's current law is valid for

- (a) DC circuit only
- (b) AC circuit only
- (c) Both DC and AC circuits
- (d) Sinusoidal source only

Ans: (c)

458. The output voltage of a battery drops from 100 V with zero load current to 80 V when load current is 2 A. The internal resistance of the battery is

- (a) 10Ω
- (b) 20Ω
- (c) 40Ω
- (d) 50Ω

Ans: (a)

459. A capacitor dissipates _____ energy.

- (a) 0%
- (b) 10% of the stored
- (c) 20% of the stored
- (d) 50% of the stored

Ans: (a)

460. Kirchhoff's current law states that

- (a) Net current flow at the junction is positive
- (b) Algebraic sum of the currents meeting at the junction is zero.
- (c) No current can leave the junction without some current entering it.
- (d) Total sum of currents meeting at the junction is zero.

Ans: (b)

461. According to Kirchhoff's voltage law, the algebraic sum of all IR drops and e.m.f.s in any closed loop of a network is always

- (a) Negative
- (b) Positive
- (c) Determined by battery e.m.f.s
- (d) Zero

Ans: (d)

462. Kirchhoff's current law is applicable to only

- (a) Junction in a network
- (b) Closed loops in a network
- (c) Electric circuits
- (d) Electronic circuits

Ans: (a)

463. Mesh analysis is applicable only for the network which is in nature.

- (a) Polar
- (b) Planer
- (c) Non-polar
- (d) Non-planer

Ans: (b)

464. A voltage source and two resistors are connected in parallel. Suppose that $v_s=150\text{V}$, $R_1=50\Omega$ and $R_2=25\Omega$. Then each resistance contains current?

- (a) $I_1 = 3 \text{ A}$ and $I_2 = 6 \text{ A}$
- (b) $I_1 = 6 \text{ A}$ and $I_2 = 3 \text{ A}$
- (c) $I_1 = 3 \text{ A}$ and $I_2 = 5 \text{ A}$
- (d) $I_1 = 2 \text{ A}$ and $I_2 = 3 \text{ A}$

Ans: (a)

465. A current source and two resistors are connected in series, suppose that $i_s = 25 \text{ mA}$, $R_1 = 4\Omega$ and $R_2 = 8\Omega$. What is the voltage across each resistor?

- (a) $V_1 = 1 \text{ V}$ and $V_2 = 2 \text{ V}$
- (b) $V_1 = 0.1 \text{ V}$ and $V_2 = 2 \text{ V}$
- (c) $V_1 = 0.2 \text{ V}$ and $V_2 = 0.2 \text{ V}$
- (d) $V_1 = 0.1 \text{ V}$ and $V_2 = 0.2 \text{ V}$

Ans: (d)

466. A voltage source of 10 V and resistor are connected in series. Specify the resistance R so that both of the following conditions are satisfied: $i > 40 \text{ mA}$ and the power absorbed by the resistor is $< 0.5 \text{ W}$.

- (a) 260Ω
- (b) 250Ω
- (c) 220Ω
- (d) 200Ω

Ans: (c)

467. Two resistors of 200 ohm and 100 ohm are connected in parallel to a 100 volt source. Total current taken by the circuit will be -
(a) 0.66 Ampere
(b) 3.0 Ampere
(c) 0.33 Ampere
(d) 1.5 Ampere
(e) **Ans: (d)**
468. If a D.C. 240 V is connected across 240 (ohm) resistance, the power of the load is
(a) 240 watts
(b) 1 watt
(c) 10 watts
(d) 480 watts
Ans: (a)
469. A network is said to be reciprocal if:
(a) $Z_{12} = Z_{21}$
(b) $Y_{12} = Y_{21}$
(c) $AD - BC = 1$
(d) all of these
Ans: (d)
470. A 12 V battery with an internal resistance 0.5 ohms supply feeds a series circuit containing 20 ohms, 10 ohms, and R. Find the value of R if the current in the circuit is 0.26 A.
(a) 14.5 ohms
(b) 15.6 ohms
(c) 4.5 ohms
(d) 5.5 ohms
Ans: (b)
471. Superposition theorem is not applicable to network containing
(a) Non linear elements
(b) Dependent voltage source
(c) Dependent current source
(d) Transformer
Ans: (a)
472. Which of the following theorems can be applied to any network linear or non-linear, active or passive, time variant or time invariant?
(a) Thevenin theorem
(b) Norton theorem
(c) Tellegen theorem
(d) Superposition theorem
Ans: (c)

473. If the source impedance is capacitive, for maximum transfer of power from the source to the load, the load should be

- (a) Capacitive
- (b) Resistive
- (c) Complex conjugate of complex source impedance
- (d) Exactly the same as the source impedance

Ans: (c)

474. Which of the following is incorrect with regard to the reciprocity theorem?

- (a) Applicable for single voltage source
- (b) Initial conditions are assumed to be zero
- (c) There should not be any extra dependent or independent sources in network
- (d) None of these

Ans: (d)

475. When a source is delivering maximum power to a load, the efficiency of the circuit.

- (a) Is always 50%
- (b) Is always 75%
- (c) Is always 100%
- (d) Depends on the circuit parameters.

Ans: (a)

476. The Thevenin and Norton circuits are

- (a) Single frequency equivalent circuits
- (b) Multi frequency equivalent circuits
- (c) Equivalent independent of frequency
- (d) Band frequency equivalent circuits

Ans: (a)

477. For a circuit containing linear dependent sources, the following holds in general
The superposition theorem cannot be applied

- (a) The solution requires the solving of multiple non-linear equations.
- (b) The Tellegen theorem does not apply
- (c) The superposition theorem is valid.

Ans: (d)

478. Consider the following statements

1. The networks with passive elements are always reciprocal
2. All the asymmetrical networks are always non-reciprocal
3. The Ohm's Law is applicable even for the dependent sources.

Which of the above statements are/is true?

- (a) 1 and 2
- (c) 3 and 1
- (b) 2 and 3
- (d) only 1

Ans: (d)

479. Consider the following statements

1. The source transformation is valid even for the ideal sources.
2. The Norton theorem is valid for active as well as for passive networks.
3. The maximum power transfer theorem is applicable for fixed loads. Which of the above statements are/is true?

- (a) 1 and 2
- (c) 3 and 1
- (b) 2 and 3
- (d) only 2

Ans: (d)

480. Consider the following statements

- P. The superposition theorem is applicable to only for the passive networks.
- Q. The Tellegen's theorem is applicable to both active as well as passive networks.
- R. In RL circuit with DC excitation the entire steady state source voltage will be dropped across 'L' only.

Which of the above statements is/are true?

- (a) P only
- (b) Q only
- (c) P and Q
- (d) P, Q and R

Ans: (b)

481. To which of the following Superposition theorem is applicable?

- (a) Dependent voltage sources
- (b) Dependent current sources
- (c) Transformers
- (d) All the above

Ans: (d)

482. It was known that a balanced Wheatstone bridge will remain balanced even when the positions of detector and source are interchanged. This observation is based on which of the following theorems?

- (a) Pythagoras theorem
- (b) Duality theorem
- (c) Reciprocity theorem
- (d) None of these

Ans: (c)

483. Which of the following statements is/are correct about Norton Theorem?

- A. The value of the current source is the short circuit current between the two terminals of the network.
 - B. Resistance is the equivalent resistances measured between the terminals of the network with all the energy sources are replaced by their internal resistance.
- (a) Only A is correct
 - (b) Only B is correct
 - (c) Both A & B is correct
 - (d) Both A and B is incorrect

Ans: (c)

484. For maximum transfer of power, internal resistance of the source should be

- (a) Equal to load resistance
- (b) Less than the load resistance
- (c) Greater than the load resistance
- (d) None of the above

Ans: (a)

485. While calculating R_{th} in Thevenin's theorem and Norton equivalent

- (a) All independent sources are made dead
- (b) Only current sources are made dead
- (c) Only voltage sources are made dead
- (d) All voltage and current sources are made dead

Ans: (a)

486. The superposition theorem requires as many circuits to be solved as there are

- (a) Sources, nodes and meshes
- (b) Sources and nodes
- (c) Sources
- (d) Nodes

Ans: (c)

487. Norton's theorem results in

- (a) A voltage source with impedance in parallel
- (b) A current source with impedance in parallel.
- (c) A voltage source alone
- (d) A current source alone

Ans: (b)

488. For a network thevenin equivalent is given by $V_{th} = 10\text{ V}$ and $R_{th} = 50\Omega$. If this network is shunted by another 50Ω at load. What is the new Thevenin equivalent of the network?

- (a) 5V, 50Ω
- (b) 5V, 25Ω
- (c) 10V, 50Ω
- (d) 10V, 25Ω

Ans: (b)

489. Which of the following theorem enables a number of voltage (or current) source to be combined directly into a single voltage (or current) source.

- (a) Compensation theorem
- (b) Reciprocity theorem
- (c) Superposition theorem
- (d) Millman's theorem

Ans: (d)

490. Superposition theorem is used to obtain current in or voltage across any conductor of the:

- (a) AC network/AC
- (b) Magnetic network
- (c) Non-linear network
- (d) Linear network

Ans: (d)

491. "Maximum power output is obtained from a network when the load resistance is equal to the output resistance of the network as seen from the terminals of the load".

The given statement is associated with:

- (a) Millman's theorem
- (b) Thevenin's theorem
- (c) Superposition theorem
- (d) Maximum power transfer theorem

Ans: (d)

492. The maximum power that can be transmitted in a network between sources and loads when the system is subject to small disturbances its disturbances called:

- (a) Steady State Stability Limit
- (b) Transient Stability Limit
- (c) Sub-Transient stability Limit
- (d) None of the above

Ans: (a)

493. In Thevenin's theorem, to find Z:

- (a) All independent voltage sources are short circuited and all independent current sources are open circuited
- (b) All independent voltage sources are open circuited and all independent current sources are short circuited
- (c) All independent voltage sources are short circuited and all independent current sources are short circuited
- (d) All independent voltage sources re open circuited and all independent current sources are open circuited

Ans: (a)

494. Closed circuit techniques are based on

- (a) Superposition theorem
- (b) Thevenin's theorem
- (c) Kirchoff's current law
- (d) Kirchoff's voltage law

Ans: (b)

495. 'This theorem is applicable only to two sources directly connected in parallel. It is not applicable where there are resistance elements between the sources'. This theorem is-

- (a) Millman's theorem
- (b) Reciprocity theorem
- (c) Thevenin's theorem
- (d) Compensation theorem

Ans: (a)

496. The superposition theorem is based on the concept of

- (a) Duality
- (b) Linearity
- (c) Reciprocity
- (d) Non-linearity

Ans: (b)

497. Two identical 2A, 4Ω Norton equivalent circuits are connected in parallel with the like polarity. Combined Norton equivalent circuit will be -----
- (a) 3A, 4 ohm
 - (c) 4A, 6 ohm
 - (b) 2A, 4 ohm
 - (d) 4A, 2 ohm
- Ans: (d)**
498. Superposition theorem requires as many circuits to be solved as there are
- (a) Sources
 - (b) Nodes
 - (c) Sources + nodes
 - (d) Sources + nodes + meshes
- Ans: (a)**
499. Two coils in differential connection have self induction of 2 mH and 4 mH and a mutual inductance of 0.15 mH. The equivalent inductance of the combination is
- (a) 5.7mH
 - (b) 5.85mH
 - (c) 6 mH
 - (d) 6.15 mH
- Ans: (a)**
500. For a pair of lossless magnetically coupled coils with respective self inductance L_1 , L_2 (with $L_1 < L_2$) and mutual inductance M , the following is generally true.
- (a) $M < L_1 + L_2$
 - (b) $M^2 < L_1 L_2$
 - (c) $M < \min(L_1, L_2)$
 - (d) $L_1 < M < L_2$
- Ans: (b)**
501. The maximum value of mutual inductance of two inductively coupled coils with self inductance $L_1 = 49$ mH and $L_2 = 81$ mH
- (a) 130 mH
 - (b) 63 mH
 - (c) 32 mH
 - (d) 3969 mH
- Ans: (b)**
502. Which of the following currents can induce the maximum induced voltage in a coil?
- (a) 1A, DC
 - (b) 1A, 100 Hz
 - (c) 1A, 1 Hz
 - (d) 20A, DC

Ans: (b)

503. Two inductances of 1 H each are coupled together. The maximum value of mutual inductance between them is:

(a) 2 H
(c) 0.25 H
(b) 0.5 H
(d) 1 H

Ans: (d)

504. Which of the following is a unit of reluctance?

(a) Tesla
(b) Henry/Wb
(c) At/Wb
(d) Wb

Ans: (c)

505. Consider two coils with an inductance of 64 mH and 81 mH respectively. What is the mutual inductance between the coils if the coefficient of coupling between two coils is 0.45?

(a) 32.4 mH
(b) 64.8 mH
(c) 72.5 mH
(d) None of these

Ans: (a)

506. Which of the following factors determine the inductance?

(a) Number of turns
(b) Permeability
(c) Coil length
(d) All the above

Ans: (d)

507. What is the equivalent inductance of a combination of two coils which have self inductance of 2 mH and 4 mH respectively and a mutual inductance of 0.15 mH?

(a) 7.5 mH
(b) 5.7 mH
(c) 6.15 mH
(d) None of these

Ans: (b)

508. A circuit possesses an inductance of 1 H when a current through coil is changing uniformly at the rate of 1 A/s inducing an opposing emf of 'X' volts in it. What is the value of 'X'?

- (a) 1
- (b) 1.5
- (c) 2
- (d) 2.5

Ans: (a)

509. Inductive reactance is defined as the opposition offered by the of a circuit to the flow of an alternating sinusoidal current.

- (a) Resistance
- (b) Inductance
- (c) Capacitance
- (d) Voltage

Ans: (b)

510. Calculate the mutual inductance for a system defined below. Two coils P and Q are kept in parallel planes, such that 70% of the flux produced by coil P links with coil Q. The number of turns in coil P is 10,000 and in coil Q is 12,000. A current of 4 A in coil P produces a flux of 0.04 mWb while a current of 4 A in coil Q produces a flux of 0.08 mWb.

- (a) 1.25 H
- (b) 0.90 H
- (c) 0.10 H
- (d) 3.21 H

Ans: (c)

511. Calculate the reluctance of a magnetic coil which is wound uniformly on an iron core provided that the relative permeability of the iron is 1400. Also, the length of the magnetic circuit is 70 cm and the cross-sectional area of the core is 5 cm².

- (a) 3.6×10^5 AT/Wb
- (b) 7.9×10^5 AT/Wb
- (c) 7.9×10^8 AT/Wb
- (d) 3.6×10^8 AT/Wb

Ans: (b)

512. Calculate the inductance of coil which is wound uniformly on an iron core. Given: Relative permeability of the iron: 1400. Length of the magnetic circuit: 70 cm. Cross-sectional area of the core: 5 cm² Number of turns: 1000.

- (a) 2.53 H
- (b) 8.24 H
- (c) 1.25 H
- (d) 3.56 H

Ans: (c)

513. A 8H choke is carrying a current of 500 mA. The energy supplied by inductor is:

- (a) 2 J
- (b) 4 J
- (c) 0.5 J
- (d) 1 J

Ans: (d)

514. The magnetic field intensity in a material whose relative permeability is 1 when the flux density is 0.005T is:

- (a) 250 AT/m
- (b) 452 AT/m
- (c) 1775 AT/m
- (d) 3980 AT/m

Ans: (d)

515. The unit of reluctance is:

- (a) Ampere-tum
- (b) Ampere-turn/meter
- (c) Ampere-tum/weber
- (d) It is dimensionless

Ans: (c)

516. A 100 tum coil has inductance of 6 mH. If the number of turns is increased to 200, all other quantities remaining the same, the inductance will be:

- (a) 24 mH
- (b) 12 mH
- (c) 3 mH
- (d) None of these

Ans: (a)

517. A magnet is kept in air surrounded by an iron ring. The magnetic lines of force from the magnet will be

- (a) Crowded in the ring
- (b) Crowded in air
- (c) Evenly distributed
- (d) None

Ans: (b)

518. If both the number of turns and core length of an inductive coil are doubled, then its self inductance will be

- (a) Halved
- (b) Doubled
- (c) Quadrupled
- (d) Unaffected

Ans: (b)

519. Mutual inductance between two magnetically coupled coils depends on

- (a) Number of turns only
- (b) Permeability of the core only
- (c) Cross-sectional area of their common core only
- (d) All of the above

Ans: (d)

520. If 1 ampere current is flowing through a 100 mH coil, then energy stored in the coil is

- (a) 0.05 Joules
- (b) 0.5 Joules
- (c) 5.0 Joules
- (d) None of these

Ans: (a)

521. When the current in a coil is increased from 2 A to 4 A in 0.05 seconds, the e.m.f. induced in the coil is 8 V. The self inductance of the coil is

- (a) 0.8 H
- (b) 0.4 H
- (c) 0.2 H
- (d) 0.1 H

Ans: (c)

522. The air core coil of a magnetic circuit has 100 turns. The core of the circuit has length of 1m. What must be the inductance of the coil if core diameter is 2 cm?

- (a) 6 μH
- (b) 3.95 μH
- (c) 2 μH
- (d) 1 μH

Ans: (b)

523. Which of the following terms is analogous to conductivity?

- (a) Inductance
- (b) Permeability
- (c) Retentivity
- (d) Resistivity

Ans: (b)

524. Two coupled inductors $L_1 = 0.2 \text{ H}$ and $L_2 = 0.8 \text{ H}$ have coefficient of coupling $K = 0.7$. The mutual inductance M is

- (a) 0.2 H
- (b) 0.28 H
- (c) 0.112 H
- (d) 1 H

Ans: (b)

525. Two coils of inductance 4 and 6 Henry are connected in series. If their mutual inductance is 3 Henry, what is the equivalent inductance of the combination if mutual inductance opposes the self inductance

- (a) 2 H
- (b) 1 H
- (c) 4 H
- (d) 16 H

Ans: (c)

526. From source $V = 200 \cos \omega t$, a load draws current $i = 2.5 \text{ A}$ at power factor 0.6 lagging. The load impedance is:

- (a) $(48 + 64j) \Omega$
- (b) $(40 + 50j) \Omega$
- (c) $(30 + 64j) \Omega$
- (d) $(48 + 50j) \Omega$

Ans: (a)

527. In a source free RLC circuit (series), if the neper frequency is greater than undamped natural frequency, then the response is

- (a) Over damped
- (b) Under damped
- (c) Critically damped
- (d) Oscillatory

Ans: (a)

528. The instantaneous power in ac circuits can be obtained by taking product of the instantaneous values of and -----

- (a) Current, voltage
- (b) Frequency, voltage
- (c) Frequency, current
- (d) Frequency (max), voltage

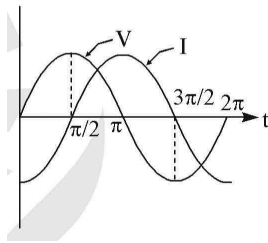
Ans: (a)

529. Which of the following circuit will be unity power factor?

- (a) Inductance
- (b) Resistance
- (c) Capacitance
- (d) Inductance and Capacitance

Ans: (b)

530. The wave forms shown below indicate:



- (a) V lags I by π
- (b) V leads I by π
- (c) V lags I by $\pi/2$
- (d) V leads I by $\pi/2$

Ans: (d)

531. An alternating voltage is given by $V = 20 \sin 157t$, the frequency of the alternating voltage is

- (a) 75 Hz
- (b) 100 Hz
- (c) 50 Hz
- (d) 25 Hz

Ans: (d)

532. Resonance in RLC series circuit occurs at a frequency:

- (a) $f_r = \frac{1}{\pi\sqrt{LC}}$
- (b) $f_r = 2\pi\sqrt{LC}$
- (c) $f = \frac{R}{2\pi\sqrt{LC}}$
- (d) $f = \frac{1}{2\pi\sqrt{LC}}$

Ans: (d)

533. The parallel circuit consists of an inductive branch with R and L as its resistance and inductance, and a capacitance branch with C farad. The impedance offered "by this circuit under resonance condition is given by:

- (a) $Z = LCR$
- (b) $Z = R/LC$
- (c) $Z = L/CR$
- (d) $Z = LC/R$

Ans: (c)

534. In an RLC series circuit the condition below the resonant frequency is:

- (a) $X_c > X_L$
- (b) $X_c + X_L$
- (c) $X_c < X_L$
- (d) $X_c = X_L$

Ans: (a)

535. In a source free RLC parallel circuit, $R = 4\Omega$, $L = 8H$ and $C = \frac{1}{2}F$. The natural response is

- (a) Over damped
- (b) Critically damped
- (c) Under damped
- (d) Oscillatory

Ans: (c)

536. An alternating voltage is given by $V = 200 \sin 314t$. Its rms value will be:

- (a) 110 V
- (b) 282.8 V
- (c) 121.4 V
- (d) 141.4 V

Ans: (d)

537. Two sinusoidal currents are given by following equations: $i_1 = 10 \sin(\omega t + \pi/3)$,
 $i_2 = 15 \sin(\omega t - \pi/4)$

The phase difference between them is

- (a) 105°
- (b) 75°
- (c) 15°
- (d) 60°

Ans: (a)

538. The reactance offered by a capacitor to an alternating current of frequency 50 Hz is 10 ohm. If frequency is increased to 100 Hz, the reactance will be

- (a) 2.5 ohm
- (b) 5.0 ohm
- (c) 20.0 ohm
- (d) 40.0 ohm

Ans: (b)

539. The r.m.s. value of a half-wave rectified alternating current is 10 A. Its value for fullwave rectification will be

- (a) $20/\pi$ A
- (b) $40/\pi$ A
- (c) $20/\sqrt{2}$ A
- (d) 20 A

Ans: (c)

540. An alternating current given by $i = 14.14 \sin(\omega t + \pi/6)$ has an r.m.s. value of

- (a) 1.96 A
- (b) 7.07 A
- (c) 10.0 A
- (d) 14.14 A

Ans: (c)

541. For an RLC series AC circuit, the current at series resonance is

- (a) Maximum at lagging power factor
- (b) Maximum at leading power factor
- (c) Maximum at unity power factor
- (d) Minimum at unity power factor

Ans: (c)

542. If $v = (a + jb)$ and $i = (c + jd)$, then active power will be given by

- (a) $ac + ad$
- (b) $ac + bd$
- (c) $bc - bd$
- (d) $ad + bc$

Ans: (b)

543. In an RLC series AC circuit, if frequency is below the resonant frequency, then

- (a) $X_c = X_L$
- (b) $X_c < X_L$
- (c) $X_c > X_L$
- (d) None of these

Ans: (c)

544. An R-L series AC circuit has $R = 10 \text{ ohm}$ and $X_L = 10 \text{ ohm}$. It is connected to an AC voltage source, the phase angle between voltage and current is

- (a) 30°
- (b) 45°
- (c) 60°
- (d) 36.8°

Ans: (b)

545. In a delta connection, line current lags behind phase current by:

- (a) 30°
- (b) 60°
- (c) 90°
- (d) 120°

Ans: (a)

546. In a series RC circuit the voltage across a pure capacitor is 12V and the voltage across a pure resistance is 5V. Find the source voltage

- (a) 13 V
- (b) 17 V
- (c) 7 V
- (d) 2.7 V

Ans: (a)

547. The instantaneous voltage and current across a load is given by $v = 50 \sin(314t - \pi/6)$ volts and $i = 20 \sin(314t - \pi/2)$ amperes respectively. The active power consumed by the load is

- (a) 500 watt
- (b) 125 watt
- (c) 250 watt
- (d) 200 watt

Ans: (c)

548. In series resonance circuit, increasing inductance to twice its value and capacitance to double of its value then new resonant frequency will be:

- (a) Twice the original resonant frequency
- (b) Half of the original resonant frequency
- (c) It remains same
- (d) Four times the original resonant frequency

Ans: (b)

549. A balanced delta-connected load $(20 + j16)$ ohm/phase is connected to a 3-phase 230 V balanced supply. The line current and the real power drawn respectively are

- (a) 19.9 A and 3.17 kW
- (b) 15.55 A and 4.83 kW
- (c) 19.9 A and 6.34 W
- (d) 11.5 A and 3.17 kW

Ans: (b)

550. If the true power is 120 W and power factor is 0.68, then what will be the apparent power (in VA)?

- (a) 81.6
- (b) 17.6
- (c) 176.47
- (d) 103.2

Ans: (c)

551. What is the value of current in parallel RLC circuit under resonance condition?

- (a) Zero
- (c) Maximum
- (b) Minimum
- (d) None of these

Ans: (b)

552. A parallel RLC circuit has $R = 10000 \Omega$, $L = 10\text{mH}$ and $C = 1 \mu\text{F}$. The resonant frequency ω_0 (rad/sec) and Q are respectively given by

- (a) 10^4 and 200
- (b) 10^2 and 1
- (c) 10^4 and 100
- (d) 10^2 and 100

Ans: (c)

553. A balanced delta connected load has an impedance of $9 \angle 30^\circ \Omega$ /phase. What is the impedance/phase of its equivalent star?

- (a) $27 \angle 30^\circ \Omega$
- (b) $27 \angle 90^\circ \Omega$
- (c) $3 \angle 30^\circ \Omega$
- (d) $3 \angle 20^\circ \Omega$

Ans: (c)

554. For parallel RLC circuit at resonance the expression for quality factor is

- (a) $1/\omega_0 RC$
- (b) $\omega_0 L/R$
- (c) $\omega_0 RC$
- (d) $L/\omega_0 R$

Ans: (c)

555. R and C are connected in parallel across a sinusoidal voltage of 240 V. If the currents through the source and the capacitor are 5 A and 4 A respectively, then what is the value of R ?

- (a) 14Ω
- (b) 48Ω
- (c) 80Ω
- (d) 240Ω

Ans: (c)

556. Current at resonance in series circuit is ----- and in parallel circuit is -----

- (a) Minimum, maximum
- (b) Maximum, minimum
- (c) Maximum, maximum
- (d) Minimum, minimum

Ans: (b)

557. An ac voltage has frequency of 50 Hz with peak amplitude of 100 V In how many seconds after the zero value of 86.6 V?

- (a) 1/300 sec
- (b) 1/100 sec
- (c) 1/150 sec
- (d) 1/600 sec

Ans: (a)

558. An AC voltage is described by $v(t) = 10\cos(400\pi t)$, find out frequency and RMS value of voltage.

- (a) 400 Hz, 7.07 V
- (b) 400 Hz, 14.14 V
- (c) 200 Hz, 14.14 V
- (d) 200 Hz, 7.07 V

Ans: (d)

559. The percentage reactance of a 100 KVA, 100, 5kV is given by:

- (a) 20 %
- (b) 4 %
- (c) 2 %
- (d) 40 %

Ans: (b)

560. A resistor of 100Ω is connected in series with a $50\mu\text{F}$ capacitor at 50 Hz, 200V supply. What is the phase angle and power factor ?

- (a) 32.48° , 0.6365
- (b) 32.48° , 0.8435
- (c) 36.68° , 0.5370
- (d) 32.48° , 0.5370

Ans: (b)

561. The main disadvantage with Nickel-Cadmium cells is

- (a) They have a high-energy density
- (b) They can be recharged more times than other types of rechargeable batteries
- (c) They have to be fully discharged before recharging, because they suffer from a memory effect
- (d) All the above

Ans: (c)

562. _____ works on the chemical effects of current

- (a) Power factor meter
- (b) Voltmeter
- (c) DC ampere hour meter
- (d) Wattmeter

Ans: (c)

563. Which of the following batteries does not require trickle charging?

- (a) Lead acid cell
- (b) Alkaline cell
- (c) Lead acid and Alkaline cell both
- (d) Neither lead acid nor alkaline cell

Ans: (b)

564. The most common used primary cell is

- (a) Lithium cell
- (b) Nickel iron cell
- (c) Lead acid cell
- (d) Nickel cadmium cell

Ans: (a)

565. In dry cells, electrons are released at

- (a) Cathode and anode both
- (b) Outside the electrolyte chamber
- (c) Anode
- (d) Cathode

Ans: (c)

566. Salt solutions are

- (a) Insulators
- (b) Semiconductors
- (c) Good conductors of electricity
- (d) Do not possess electrical properties

Ans: (c)

567. Positive Electrode of a dry cell is made of

- (a) Copper
- (b) Carbon
- (c) Zinc
- (d) Sulphur

Ans: (b)

568. Generally the Leclanche cell is used for

- (a) Continuous purposes
- (b) Heavy purposes
- (c) Low purposes
- (d) Intermittent purposes

Ans: (d)

569. A solar cell is
- (a) Same as photometer
 - (b) Same as a photo emissive cell
 - (c) Same as photo conductive cell
 - (d) Same as photo volatic cell

Ans: (d)

570. Internal resistance of a cell depends on
- (a) Terminal voltage
 - (b) Torque
 - (c) Current
 - (d) Area of the plates

Ans: (d)

571. What will be the energy used by the battery if the battery has to dilever 6.28×10^{18} electrons with potential difference of 20 V across the terminal?
- (a) 5 J
 - (b) 10 J
 - (c) 15 J
 - (d) 20 J

Ans: (d)

572. The usable capacity of a battery-----
- (a) Increases with increased discharge current
 - (b) Decreases with increased discharge current
 - (c) Is independent of discharge current
 - (d) Depends on discharge time

Ans: (b)

573. Which one of the following sources of energydoes a fuel cell consist of ?
- (a) Hydrogen
 - (b) Electrical storage
 - (c) Natural gas
 - (d) Petroleum

Ans: (a)

574. When a lead acid cell is recharged:
- (a) The anode becomes dark chocolate brown colour
 - (b) Voltage rises
 - (c) Energy is absorbed by the cell
 - (d) All of these

Ans: (d)

575. A 6V battery is connected to 300Ω load. Under these conditions, it is rated at 40 Ah. How long can it supply current to the load?

- (a) 1000 h
- (b) 2000 h
- (c) 200 h
- (d) 4000 h

Ans: (b)

576. Petroleum Jelly is applied to the terminals of the lead acid battery in order to prevent.

- (a) Corrosion
- (b) Local heating
- (c) Short-circuiting
- (d) All of these

Ans: (a)

577. Trickle charging of storage battery helps to

- (a) Prevent sulfation
- (b) Keep it fresh and fully charged
- (c) Maintain proper electrolyte level
- (d) Increase its reverse capacity

Ans: (b)

578. The term ampere-hour (Ah) is associated with

- (a) Rectifiers
- (b) Transformers
- (c) Electromagnets
- (d) Storage cells

Ans: (d)

579. Cells are connected in series in order increase the

- (a) Current capacity
- (b) Life of the cells
- (c) Voltage rating
- (d) Terminal voltage

Ans: (c)

580. The emf of a cell depends upon

- (a) The internal resistance
- (b) External resistance
- (c) Electrolyte and electrodes of the cell
- (d) None of the factors

Ans: (a)

581. What is the name of the instrument used to measure the specific density of a battery electrolyte
(a) Pyrometer

(b) Hydrometer

(c) Lactometer

(d) Fuel gauge

Ans: (b)

582. Which of the following primary cell has the lowest voltage?

(a) Lithium

(b) Zinc-chloride

(c) Mercury

(d) Carbon-zinc

Ans: (c)

583. The active materials of a nickel-iron battery are

(a) Nickel hydroxide

(b) 21 % solution of KOH

(c) Powdered iron and its oxide

(d) All of the above

Ans: (d)

584. During discharging of lead acid cells, the terminal voltage decrease with the decrease in

(a) Temperature

(b) Discharge rate

(c) State of charge

(d) None of these

Ans: (b)

585. The process of coating of a metallic surface with a harder metal by electro-deposition is known as:

(a) Electrofacing

(b) Electro ionisation

(c) Electrometallisation

(d) Electroforming

Ans: (a)

586. The function of the reference electrode in a pH meter is so

(a) Produce a constant voltage

(b) Provide temperature compensation

(c) Provide a constant current

(d) Measure average pH value

Ans: (a)

587. How can we measure the battery capacity in SI units?

- (a) Wh
- (b) Ah
- (c) kWh
- (d) Vh

Ans: (b)

588. Discharging of a battery

- (a) Reduces specific gravity of the electrolyte
- (b) Increases specific gravity of the electrolyte
- (c) Produces excessive gassing
- (d) Increases the temperature

Ans: (a)

589. When cells are arranged in parallel:

- (a) Current capacity increases
- (b) Current capacity decreases
- (c) The e.m.f. increases
- (d) The e.m.f. decreases

Ans: (a)

590. A battery has a short circuit current 30 A and open circuit voltage of 24 V. If the battery is connected to an electric bulb of resistance 2Ω , the power dissipated by the bulb is:

- (a) 80 W
- (b) 1800 W
- (c) 112.5 W
- (d) 147 W

Ans: (d)

II. ELECTRICAL MACHINES

591. Deep bar rotor construction is used in three phase induction motors to mainly:

- (a) Control speed
- (b) Control power factor
- (c) Increase starting torque
- (d) None of these

Ans: (c)

592. If a 3-phase, 40V, 50Hz, 4 pole induction motor is running at a slip of 5% then the relative speed of rotor field with respect to stator field is:
- (a) Zero
 - (b) 75 rpm
 - (c) 142.5 rpm
 - (d) 1500 rpm

Ans: (a)

593. A 3-phase induction motor is running at slip 's'. If its two supply leads are interchanged, then the operating slip at that instant will be:
- (a) 2s
 - (c) (2-s)
 - (b) (1-s)
 - (d) Zero

Ans: (c)

594. Skewing of rotor bars eliminate the:
- (a) Effect of cogging
 - (b) Entire effect of crawling
 - (c) Magnetic noise
 - (d) Vibration due to unequal force developed on rotor

Ans: (a)

595. A 3-phase delta connected squirrel cage induction motor when started with a DOL starter has a starting torque of 600 Nm. Its starting torque when star delta starter is used:
- (a) 600 Nm
 - (c) 300 Nm
 - (b) 200 Nm
 - (d) 1200 Nm

Ans: (b)

596. Which of the following motor has squirrel cage winding on the stator:
- (a) 3 phase squirrel cage induction motor
 - (b) Single phase squirrel cage pump motor
 - (c) Single phase ceiling fan induction motor
 - (d) Single phase table fan induction motor

Ans: (c)

597. A 6-pole, 50 Hz, 3- Φ induction motor is running at 950 rpm and has rotor copper loss of 5 kW. Its rotor input is kW
- (a) 100
 - (b) 10
 - (c) 95
 - (d) 5.3

Ans: (a)

598. What is the frequency of an alternator, if A = number of poles and B = revolution made per Second?
- (a) AB Hz
 - (b) $AB/4$ Hz
 - (c) $AB/2$ Hz
 - (d) None of these

Ans: (c)

599. The starting torque can be obtained in case of single phase induction motor with identical main and auxiliary windings by connecting
- (a) A capacitors across the mains
 - (b) A capacitor in series with the machine
 - (c) A capacitor in series with the auxiliary winding
 - (d) The main and auxiliary winding in series

Ans: (c)

600. When the load on an induction motor is increased from no load to full load:
- (a) Both slip and power factor decrease
 - (b) Both slip and power factor increase
 - (c) Slip decreases and power factor increases
 - (d) Slip increases and power factor decreases

Ans: (b)

601. Which of the following statements is correct regarding the actual voltage which is used for setting up the useful flux in the air gap of a 3-phase induction motor?
- (a) It is equal to applied voltage
 - (b) It is greater than applied voltage
 - (c) It is less than applied voltage
 - (d) It is equal to rotor induced emf

Ans: (a)

602. Among the following types of single phase induction motor which one has the highest power factor at full load?
- (a) Shaded pole type
 - (b) Split-phase type
 - (c) Capacitor-start type
 - (d) Capacitor-run type

Ans: (d)

603. The thermal loading on the motor can be determined by:
- (a) Duty/Load cycle
 - (b) Temperature of the winding
 - (c) Age of the motor
 - (d) Ambient conditions

Ans: (a)

604. A torque is developed in an electro mechanical energy conversion device, the value of which depends upon:
- (a) Stator field strength and torque angle
 - (b) Stator field and rotor field strengths
 - (c) Stator field and rotor field strengths and the torque angle
 - (d) Stator field strength only

Ans: (c)

605. Which of the following methods could be used to start a three-phase cage-type induction motor?

- I. Direct-on-line starting
- II. Auto-transformer starting
- III. Star-delta starting

Choose the correct answer from the options given below.

- (a) Only I and II
- (b) Only II and III
- (c) I, II and III
- (d) Only I and III

Ans: (c)

606. What phenomenon is depicted by cross-field theory in context of single-phase induction motors?

- (a) How the rotor develops torque
- (b) How the stator develops torque
- (c) How the rotor develops current
- (d) How the stator develops current.

Ans: (a)

607. Which of the following is not a type of single phase induction motor?

- (a) Resistance split phase type
- (b) Capacitor split phase type
- (c) Shaded pole type
- (d) Opaque pole type

Ans: (d)

608. What will be the frequency (cycles per second) of AC voltage of a 10 pole AC generator which rotates at 1200 rp

- (a) 100
- (b) 135
- (c) 150
- (d) 168

Ans: (a)

609. The emf induced in a coil of N turns is given by

- (a) $e = Ndt/d\phi$
- (b) $e = -Nd\phi/dt$
- (c) $e = Nd\phi/dt$
- (d) $e = d\phi/dt$

Ans: (b)

610. The synchronous speed of linear induction motor depends on

- (a) Width of the pole pitch
- (b) Number of poles
- (c) Supply frequency
- (d) Both (a) and (c)

Ans: (d)

611. Compensating winding is used in:

- (a) Capacitor start motor
- (b) Shaded pole motor
- (c) AC series motor
- (d) Capacitor run motor

Ans: (c)

612. The three phase induction motor stator windings is displaced by _ from each other.

- (a) 45° electrical
- (b) 30° electrical
- (c) 120° electrical
- (d) 90° electrical

Ans: (c)

613. A three phase induction motor is wound for 4 pole and is supplied from 50 Hz system. Calculate synchronous speed.

- (a) 1550 rpm
- (b) 1500 rpm
- (c) 1440 rpm
- (d) 1400 rpm

Ans: (b)

614. A 4 pole, 50 Hz induction motor operates at 5% slip. The frequency of emf induced in the rotor will be

- (a) 25 Hz
- (b) 2 Hz
- (c) 2.5 Hz
- (d) 50 Hz

Ans: (c)

615. If the rotor emf per phase at standstill is E_2 and the motor is operating at a slip (s), the generated rotor emf per phase under running condition will be:

- (a) $s^2 E_2$
- (b) E_2
- (c) $s E_2$
- (d) E_2/s

Ans: (c)

616. In case of 3 phase induction motors, plugging is done by:

- (a) Starting the motor on load which is more than the rated load
- (b) Pulling the motor directly on line without a starter
- (c) Interchanging connections of any two phases of stator for quick stopping.
- (d) Locking of rotor due to harmonics

Ans: (c)

617. When the supply voltage to an induction motor is reduced by 10%, the maximum torque will decrease approximately by:

- (a) 10%
- (b) 20%
- (c) 5%
- (d) 40%

Ans: (b)

618. For a single phase capacitor start induction motor which of the following statements is valid?

- (a) The capacitor is used for power factor improvement
- (b) The direction of rotation cannot be changed
- (c) The direction of rotation can be changed by interchanging the supply terminals
- (d) The direction of rotation can be changed by reversing the main winding terminals

Ans: (d)

619. In case of split phase motor, the phase shift between current in the two windings is around-

- (a) 30 degree
- (b) 70 degree
- (c) 90 degree
- (d) 120 degree

Ans: (a)

620. A 230 V, 50 Hz, 4 pole single phase induction motor is rotating in the clockwise forward direction at the speed of 1425 rpm. If the rotor resistance at standstill is 7.8 ohm, then what will be the effective rotor resistance in the backward branch of the equivalent circuit?

- (a) 2 ohm
- (b) 4 ohm
- (c) 78 ohm
- (d) 156 ohm

Ans: (a)

621. The induced e.m.f. will be maximum when a conductor cuts the magnetic field at an angle of
- (a) 15°
 - (b) 30°
 - (c) 45°
 - (d) 90°

Ans: (d)

622. The frequency of an induction motor having synchronous speed of 600 rpm is 40 Hz. Find the number of poles.
- (a) 6
 - (b) 12
 - (c) 8
 - (d) 4

Ans: (c)

623. Slip rings and brushes are found in:
- (a) Wound rotor
 - (b) Squirrel cage rotor
 - (c) Both of the above
 - (d) Neither wound nor squirrel cage rotor

Ans: (a)

624. If there are no copper losses in the rotor, then
- (a) Rotor will not run
 - (b) Rotor will run at a very low speed
 - (c) Rotor will run at a very high speed
 - (d) Rotor will run at synchronous speed

Ans: (d)

625. An induction machine works at generating mode when slip is:-
- (a) Zero
 - (b) 0 -1
 - (c) More than one
 - (d) Negative

Ans: (d)

626. braking is generally used in braking of battery operated scooters.
- (a) Plugging
 - (b) Regenerative
 - (c) Mechanical
 - (d) Rheostatic

Ans: (c)

627. In an Induction motor, number of stator slots should never be equal to number of rotor slots in order to prevent:
- (a) Crawling
 - (b) Cogging
 - (c) Over heating
 - (d) Humming sound
- Ans: (b)**

628. Speed control of single phase series motor (AC) can be done by:
- (a) Pole changing
 - (b) Frequency variation
 - (c) Voltage variation
 - (d) Shifting of brushes
- Ans: (c)**

629. _____ are employed for the operation of Jaw Crushers.
- (a) DC shunt wound motor
 - (b) Squirrel cage induction motor
 - (c) Belted slip ring induction motor
 - (d) Any DC motor
- Ans: (c)**

630. Slip of an induction motor when the rotor starts gaining speed.
- (a) Remains same
 - (b) Increases
 - (c) Decreases
 - (d) Increases or decreases
- Ans: (c)**

631. Starting torque of an induction motor is _____ applied voltage.
- (a) Directly proportional to
 - (b) Inversely proportional to
 - (c) Directly proportional to the square of
 - (d) Inversely proportional to the square of
- Ans: (c)**

632. The advantage of double squirrel cage induction motor over single cage rotor is to improve
- (a) Speed regulation
 - (b) Power factor
 - (c) Slip
 - (d) Starting torque
- Ans: (d)**

633. The main advantage of distributing the winding in slots is to -----

- (a) Reduce the size of the machine
- (b) Add mechanical strength to the winding
- (c) Reduce the amount of copper required
- (d) Reduce the harmonics in the generated emf

Ans: (d)

634. The frequency of rotor emf of an 4-pole induction motor is 2 Hz. If the supply frequency is 50 Hz, then the motor speed is

- (a) 1500 rpm
- (b) 750 rpm
- (c) 1440 rpm
- (d) 720 rpm

Ans: c

635. Which motor is used in the centrifugal pump?

- (a) Split phase induction motor
- (b) Shaded pole induction motor
- (c) Squirrel cage rotor
- (d) Capacitor start/Capacitor run induction motor

Ans: (a)

636. Which law is a consequence of the law of conservation of energy?

- (a) Lenz's law
- (b) Moore's law
- (c) Faraday's law
- (d) Kepler's law

Ans: (a)

637. At what angle difference is the main winding and the start winding separated in a split phase capacitor start induction motor?

- (a) 30° mechanical
- (b) 90° electrical
- (c) 45° electrical
- (d) 45° mechanical

Ans: (b)

638. The bearings used to support the rotor shafts are generally

- (a) Ball bearings
- (b) Bush bearings
- (c) Magnetic bearings
- (d) Needle bearings

Ans: (a)

639. Which of the following can be obtained by equivalent circuit of an induction machine?
- (a) Complete performance characteristics of the machine
 - (b) Temperature rise in the core
 - (c) Type of protection used in the machine
 - (d) Design parameters of the winding

Ans: (a)

640. A 3-phase induction motor when started picks up speed but runs stably at about half the normal speed. This is because of:
- (a) Unbalance in the supply voltages
 - (b) Non-sinusoidal nature of the supply voltage
 - (c) Stator circuit asymmetry
 - (d) Rotor circuit asymmetry

Ans: (b)

641. In an induction motor, at speed near to synchronous speed, the torque speed and torque-slip curves are approximately:
- (a) Hyperbola
 - (b) Parabola
 - (c) Ellipses
 - (d) Straight lines

Ans: (d)

642. If rotor resistance in an induction motor is small, rotor current will be:
- (a) Zero
 - (b) Low
 - (c) Large
 - (d) Infinite

Ans: (c)

643. Slip of an induction motor when the rotor starts gaining speed:
- (a) Remains same
 - (b) Increases
 - (c) Decreases
 - (d) Increases or decreases

Ans: (c)

644. In a capacitor start motor, the phase displacement starting and running winding can be nearly (in degrees):
- (a) 10
 - (b) 30
 - (c) 60
 - (d) 90

Ans: (d)

645. As compared to D.O.L. starter, Star Delta starter, during starting, operates at
- (a) full voltage
 - (b) 72% of full voltage
 - (c) 58% of full voltage
 - (d) 34% of full voltage

Ans: (c)

646. Which starting method is not used in squirrel cage induction motors?
- (a) Resistance in rotor circuit
 - (b) Resistance in stator circuit
 - (c) Auto-transformer starting
 - (d) Star delta starting

Ans: (a)

647. A 3 Φ , 460V, 100-hp, 60Hz, 6-pole induction machine delivers rated output power at a slip of 0.05. What is the speed of the rotating air gap field?
- (a) 90 rpm
 - (b) 1710 rpm
 - (c) 1800 rpm
 - (d) 1200 rpm

Ans: (d)

648. What is synchronous wattage in an induction motor?
- (a) Combined stator and rotor input in watts
 - (b) Shaft output in watts
 - (c) Stator input in watts
 - (d) Rotor input in watts

Ans: (d)

649. The direction of rotation of an ordinary shaded pole single phase induction motor:
- (a) Can be reversed by reversing the supply terminal connections to the stator winding
 - (b) Cannot be reversed
 - (c) Can be reversed by open-circuiting the shading ring
 - (d) Can be reversed by short-circuiting the shading ring

Ans: (b)

650. The rotor of an induction motor cannot run at synchronous speed because:
- (a) Stator flux would then become zero.
 - (b) Losses would increase
 - (c) Rotor torque would then become zero
 - (d) Induction rotor would then become synchronous motor.

Ans: (c)

651. In direct on line starter, no volt release is to:
- (a) Safe guard against supply fluctuations
 - (b) Safe guard the motor against sudden failure of supply
 - (c) Safe guard against over load
 - (d) Safe guard against earth faults

Ans: (b)

652. The motor used in electric traction is
- (a) DC shunt motor
 - (b) Single phase induction
 - (c) Three phase induction motor
 - (d) Synchronous motor

Ans: (c)

653. To avoid cogging in induction motor, the number of rotor slots should not be the number of rotor slots-
- (a) Greater than
 - (b) Dependent on
 - (c) Equal to
 - (d) Less than

Ans: (c)

654. Rotor of an induction motor always runs at:
- (a) More than synchronous speed
 - (b) Any speed as required
 - (c) Synchronous speed
 - (d) Less than synchronous speed

Ans: (d)

655. A three phase 50 Hz, 440 V, Induction motor has a speed of 950 rpm. If the machine has 6 poles, the percentage slip would be:
- (a) 10%
 - (b) 5%
 - (c) 1%
 - (d) 0.5%

Ans: (b)

656. A 0.5 HP, 6 pole wound rotor induction motor is excited by a 3-phase 60 Hz source. Calculate the frequency of the rotor current at standstill.
- (a) 50Hz
 - (b) 30Hz
 - (c) 60Hz
 - (d) 120Hz

Ans: (c)

657. In a 3-phase induction motor, a deep bar rotor is used for obtaining-

- (a) More starting torque
- (b) Reduced rotor loss
- (c) More pull out torque
- (d) More starting speed

Ans: (a)

658. In an induction motor the slip power recovery schemes can be used

- (a) In constant power drive only
- (b) In constant torque drive only
- (c) In both constant power and constant torque drives
- (d) None of the other options

Ans: (c)

659. A 3 phase, 4 pole squirrel cage induction motor has 36 stator and 28 rotor slots. The number of phase in the rotor is-

- (a) 3
- (b) 9
- (c) 7
- (d) 8

Ans: (c)

660. A 4 pole induction motor, supplied by a slightly unbalanced three phase 50 Hz source is rotating at 1440 rpm. What is the electrical frequency in Hz of the induced negative sequence current in the rotor?

- (a) 100 Hz
- (b) 98 Hz
- (c) 52 Hz
- (d) 48 Hz

Ans: (b)

661. An induction motor at 50 Hz with 1000 rpm speed; will have:

- (a) 8 poles
- (b) 6 poles
- (c) 4 poles
- (d) 2 poles

Ans: (b)

662. For a single phase capacitor start induction motor which of the following is valid?

- (a) Rotation can be changed by reversing main winding terminals
- (b) Direction of rotation cannot be changed.
- (c) Rotation can be changed by interchanging supply terminals
- (d) None of these

Ans: (a)

663. No load test on a three-phase squirrel cage induction motor at rated voltage is performed to obtain:

- (a) Stator and rotor resistance and reactance
- (b) Series branch parameters of equivalent circuit
- (c) Copper and core losses
- (d) Shunt branch parameters of equivalent circuit

Ans: (d)

664. A three phase squirrel cage induction motor of rating 4 pole, 3-phase, 50Hz, 5 kW, runs at a speed of 1440 rpm. The frequency of the rotor current is:

- (a) 49 Hz
- (b) 2 Hz
- (c) 50 Hz
- (d) 51 Hz

Ans: (b)

665. A single-phase induction motor is

- (a) Inherently self-starting with high torque
- (b) Inherently self-starting with low torque
- (c) Inherently non-self starting with low torque
- (d) Inherently non-self-starting with high torque

Ans: (c)

666. Which of the following are constant losses in Transformers?

- (a) Winding losses
- (b) Core losses
- (c) Both Winding & core losses
- (d) None of these

Ans: (b)

667. Two transformers with identical voltage ratings are working in parallel to supply common load. The percentage impedance of one transformer is higher compared to that of other. The load sharing between the two transformers will:

- (a) Be proportional to their percentage impedance
- (b) Be independent of their percentage impedance
- (c) Be inversely proportional to their respective impedance
- (d) Depend on the resistance to leakage reactance ratio of each transformer

Ans: (c)

668. When two transformer of different kVA rating are connected in parallel they share the load in

proportion to their respective kVA rating only when their:

- (a) kVA rating are identical
- (b) Efficiencies are equal
- (c) pu impedance are equal
- (d) Equivalent impedance are equal

Ans: (c)

669. Hysteresis loss in a transformer depends upon:

- (a) Frequency
- (b) Supply voltage
- (c) Square of the frequency alone
- (d) Square of the voltage alone

Ans: (a)

670. A 2000/200 V, 20 kVA transformer has 66 turns in the secondary. The number of primary turns is:

- (a) 660
- (b) 440
- (c) 770
- (d) 330

Ans: (a)

671. Open circuit test on a transformer gives:

- (a) Total loss
- (b) Insulation resistance
- (c) Core loss
- (d) Cu loss

Ans: (c)

672. High silicon content steel is used for transformer core construction, to:

- (a) Improve cooling of core and yoke
- (b) Reduce hysteresis loss
- (c) Reduce eddy current loss
- (d) Reduce weight of steel

Ans: (c)

673. A magnetizing force of 800 AT/m will produce a flux density in air.

- (a) 0.5 Wb/m²
- (b) 1 Wb/m²
- (c) 10 mWb/m²
- (d) 1 mWb/m²

Ans: (d)

674. The rating of transformers is expressed in:

- (a) kVA
- (b) kW
- (c) HP
- (d) kWh

Ans: (a)

675. Iron loss of a transformer can be measured by

- (a) Low power factor wattmeter
- (b) Unity power factor wattmeter
- (c) Frequency meter
- (d) Any type of wattmeter

Ans: (a)

676. Varnishes protect the insulating materials against

- (a) oil
- (b) Moisture, dirt and oil
- (c) Moisture and fire hazards
- (d) None of the above

Ans: (b)

677. A transformer having 1000 turns in primary winding is connected to a single phase 250 V a.c. supply. For inducing 400 V in secondary winding, the number of turns in secondary winding must be

- (a) 1600
- (b) 1250
- (c) 400
- (d) 250

Ans: (a)

678. A 10 kVA, 220 V/220 V, 50 Hz transformer shows 340 W in short circuit test and 168 W in open circuit test. Its efficiency at full load and 0.8 power factor lagging is approximately

- (a) 92%
- (b) 94%
- (c) 96%
- (d) 98%

Ans: (b)

679. At light load, the efficiency of a transformer is low. It is because

- (a) Copper loss is small.
- (b) Copper loss is high.
- (c) Secondary output is low.
- (d) Fixed loss is high with respect to output.

Ans: (d)

680. The condition for parallel operation of two single phase transformers is that they should have

the same

- (a) Polarity & Voltage ratio
- (b) kVA rating
- (c) kW rating
- (d) Percentage impedance

Ans: (a)

681. A transformer has negative voltage regulation when its load power factor is

- (a) Zero
- (b) Leading
- (c) Unity
- (d) Lagging

Ans: (b)

682. The no load current in a transformer lags the supply voltage by

- (a) 0°
- (b) 90°
- (c) 110°
- (d) about 75°

Ans: (d)

683. The heat run test of a transformer without its loading is performed by means of

- (a) Short circuit test
- (b) Open circuit test
- (c) Half time short circuit test and half time open circuit test
- (d) Sumpner's test

Ans: (d)

684. Distribution transformers is designed to have maximum efficiency at:

- (a) Full load
- (b) No load
- (c) About 90% of the full load
- (d) About 50% of the full load

Ans: (d)

685. Which of the following part of a transformer consists of a small vessel which contains a drying agent?

- (a) Conservator
- (b) Breather
- (c) Oil tank
- (d) Endings

Ans: (b)

686. The voltage regulation of a transformer having 4% resistance and 5% reactance at full load,

0.8 pf lagging is:

- (a) 4.60%
- (b) -4.6%
- (c) -6.2%
- (d) 6.20%

Ans: (d)

687. A 2 kVA transformer has iron-loss of 100 W and full load copper loss of 200 W. The full load efficiency at unity power factor will be

- (a) 90.90%
- (b) 85.60%
- (c) 80.60%
- (d) 86.95%

Ans: (d)

688. Two transformers are connected in parallel. These transformers do not have equal percentage impedance which results

- (a) Short-circuiting of the secondaries
- (b) Power factor of one of the transformers is leading while that of the other lagging.
- (c) Transformers having higher copper losses will have negligible core losses.
- (d) Loading of the transformers not in proportional to their kVA ratings.

Ans: (d)

689. The function of oil in a transformer is to provide

- (a) Insulation and cooling
- (b) Protection against lighting
- (c) Protection against short circuit
- (d) Lubrication

Ans: (a)

690. The transformer laminations are insulated from each other by:

- (a) Mica strip
- (b) Thin coat of varnish
- (c) Paper
- (d) Copper sheets

Ans: (b)

691. Eddy current loss in a transformer is proportional to:

- (a) Frequency
- (b) Supply Voltage
- (c) Square of the frequency
- (d) Square of the voltage

Ans: (c)

692. In a transformer, if the iron losses and copper losses are 32.8 kW and 50 kW respectively, then

at what fraction of load will the efficiency be maximum?

- (a) 0.81
- (b) 0.57
- (c) 0.7
- (d) 0.9

Ans: (a)

693. What does the Eddy current loss depend on?

- (a) Flux density
- (b) Frequency
- (c) Thickness
- (d) All of these

Ans: (d)

694. A 20,000 kVA transformer with 10% reactance will have a reactance of at 10,000 kVA base.

- (a) 10%
- (b) 20%
- (c) 15%
- (d) 5%

Ans: (d)

695. What can we reduce by using thin laminations in a machine?

- (a) Hysteresis losses
- (b) Iron losses
- (c) Eddy current losses
- (d) Copper losses

Ans: (c)

696. Which law states that an e.m.f is induced in a conductor whenever it cuts the flux?

- (a) Gauss's law for magnetism
- (b) Lenz's law of electromagnetic induction
- (c) Faraday's law of electromagnetic induction
- (d) Lorentz force law

Ans: (c)

697. A property of a transformer which makes it ideal is.

- (a) CRGO core for its primary and secondary windings
- (b) No losses and magnetic leakage
- (c) Interleaved primary and secondary windings
- (d) None of these

Ans: (b)

698. Reason for using silicon steel in electrical machines?

- (a) High retentivity
- (b) High coercivity
- (c) Low hysteresis loss
- (d) Low coercivity

Ans: (c)

699. A 25 kVA, 3300 /230 V, single phase transformer has iron and copper losses of 350 W and 400W. The efficiency at 0.8 p.f is

- (a) 96.39%
- (b) 97.09%
- (c) 98.43%
- (d) 98.04%

Ans: (a)

700. To minimise loss due to hysteresis, the magnetic material should have?

- (a) High resistivity
- (b) High retentivity
- (c) Low hysteresis coefficient
- (d) Large B-H loop area

Ans: (c)

701. The most common method of cooling employed in power transformer is:

- (a) Oil natural
- (b) Natural cooling
- (c) Air cooling
- (d) Air-blast cooling

Ans: (a)

702. Laminations of core are generally made of

- (a) cast iron
- (b) carbon
- (c) silicon steel
- (d) stainless steel

Ans: (c)

703. Which of the following does not change in a transformer?

- (a) Current
- (b) Voltage
- (c) Frequency
- (d) All of the above

Ans: (c)

704. In a transformer the energy is conveyed from primary to secondary
- (a) Through cooling coil
 - (b) Through air
 - (c) By the flux
 - (d) None of the above

Ans: (c)

705. Major insulation in a transformer is the insulation between the
- (a) LV winding and core
 - (b) LV winding and HV winding
 - (c) Turns of the windings
 - (d) Both (a) and (b)

Ans: (d)

706. Delta/star transformer works satisfactorily when
- (a) Load is balanced only
 - (b) Load is unbalanced only
 - (c) On balanced as well as unbalanced loads
 - (d) None of the above

Ans: (c)

707. Transformer breaths in when
- (a) Load on it increases
 - (b) Load on it decreases
 - (c) Load remains constant
 - (d) None of the above

Ans: (b)

708. No-load current of a transformer
- (a) Has high magnitude and low power factor
 - (b) Has high magnitude and high power factor
 - (c) Has small magnitude and high power factor
 - (d) Has small magnitude and low power factor

Ans: (d)

709. The purpose of providing iron core in a step-up transformer is
- (a) To provide coupling between primary and secondary
 - (b) To increase the magnitude of mutual flux
 - (c) To decrease the magnitude of magnetizing current
 - (d) To provide all above features

Ans: (d)

710. Two transformers operating in parallel will share the load depending upon their
- (a) Leakage reactance
 - (b) Per unit impedance
 - (c) Efficiencies
 - (d) Ratings

Ans: (b)

711. Which winding of the transformer has less cross sectional area?
- (a) Primary winding
 - (b) Secondary winding
 - (c) Low voltage winding
 - (d) High voltage winding

Ans: (d)

712. Power transformers are generally designed to have maximum efficiency around
- (a) No-load
 - (b) Half-load
 - (c) Near full-load
 - (d) 10% overload

Ans: (c)

713. Which of the following is the main advantage of an auto-transformer over a two winding transformer?
- (a) Hysteresis losses are reduced
 - (b) Saving in winding material
 - (c) Copper losses are negligible
 - (d) Eddy losses are totally eliminated

Ans: (b)

714. When a given transformer is run at its rated voltage but reduced frequency, its Flux density remains unaffected
- (a) Iron losses are reduced
 - (b) Core flux density is reduced
 - (c) Core flux density is increased

Ans: (d)

715. An ideal transformer will have maximum efficiency at a load such that
- (a) Copper loss = iron loss
 - (b) Copper loss < iron loss
 - (c) Copper loss > iron loss
 - (d) None of the above

Ans: (a)

716. If the supply frequency to the transformer is increased, the iron loss will

- (a) Not change
- (b) Decrease
- (c) Increase
- (d) Any of the above

Ans: (c)

717. The no load primary input is approximately equal to the

- (a) Iron loss of transformer
- (b) Sum of Iron loss and copper loss of transformer
- (c) Neither Iron loss of transformer nor copper loss
- (d) Copper loss of transformer

Ans: (a)

718. Regulation of a transformer is defined by rise in primary voltage required to maintain rated output voltage at a given power factor for a lagging power factor load:

- (a) From no load to 50% of full load
- (b) From no load to full load
- (c) From no load to 25% of full load
- (d) From no load to 75% of full load

Ans: (b)

719. A 1 Φ , 10 kVA, 220/110V, 50Hz transformer is connected to a 220V supply. It draws rated current at 0.8 p.f. leading. The transformer may be considered ideal. What is the kVA rating of the load?

- (a) 10
- (b) 20
- (c) 15
- (d) 8

Ans: (a)

720. If the voltage ratio of the transformer is 1:30 then the ratio of primary and secondary turns will be

- (a) 2:30
- (b) 1:30
- (c) 1:3
- (d) 2:10

Ans: (b)

721. Which quantity is preferred as a reference vector to draw a Phasor diagram in a series circuit?

- (a) Phase angle
- (b) Current
- (c) Power
- (d) Voltage

Ans: (b)

722. All day efficiency of a transformer is defined as the ratio of output to input in -

- (a) kVA at particular instant
- (b) kWh during 24 hours
- (c) kVARh at particular instant
- (d) kW during 24 hours

Ans: (b)

723. A 2000/200 V, 20 kVA transformer has 66 turns in the secondary. The number of primary of turns are:

- (a) 660
- (b) 440
- (c) 770
- (d) 330

Ans: (a)

724. A transformer has efficiency of 80% and works at 100V and 4 kW. If the secondary voltage is 240V, find the primary current.

- (a) 16.67 A
- (b) 40 A
- (c) 30 A
- (d) 10 A

Ans: (b)

725. The full load efficiency at unity power factor of a 230/115 V, 2 kVA single phase transformer having a Cu loss of 60W at half load and iron loss of 50 W is:

- (a) 92%
- (b) 87%
- (c) 90%
- (d) 98%

Ans: (b)

726. Find the line current under measurement, if a 100:5 CT is used in conjunction with a (0-5A) ammeter reads 3A.

- (a) 70 A
- (b) 35 A
- (c) 60 A
- (d) 15 A

Ans: (c)

727. Current transformers (CT) are used for:

- (a) Measurement of frequency
- (b) Measurement of large DC currents
- (c) Measurement of large alternating currents
- (d) Measurement of high voltage

Ans: (c)

728. A 3-phase transformer has its primary is delta connected and secondary in star. Secondary to primary turns ratio per phase is 5. What would be the secondary voltage for a primary voltage of 400 V?

- (a) 2000 V
- (b) 80 V
- (c) 3464 V
- (d) 138 V

Ans: (c)

729. The percentage resistance of a 100 kVA, 5kV, 5Ω resistance is given by:

- (a) 2%
- (b) 20%
- (c) 40%
- (d) 4%

Ans: (a)

730. In a transformer having 1000 primary and 400 secondary turns, if the primary voltage is 250 volts, the secondary voltage will be:

- (a) 400 Volts
- (b) 100 Volts
- (c) 625 Volts
- (d) 1600 Volts

Ans: (b)

731. Which test on transformer provides information about regulation efficiency and heating under load conditions?

- (a) Open circuit test
- (b) Back to back test
- (c) Hopkinson test
- (d) Short circuit test

Ans: (b)

732. If the flux density in the core of a transformer is increased

- (a) Frequency on secondary windings will change
- (b) Wave shape on secondary side will be distorted
- (c) Size of transformer can be reduced
- (d) Eddy current losses will be reduced

Ans: c

733. Which of the following transformer will be largest in size?

- (a) 1 kVA, 25 Hz
- (b) 1 kVA, 50 Hz
- (c) 1 kVA, 60 Hz
- (d) 1 kVA, 100 Hz

Ans: (a)

734. If the current in the armature of d.c series motor is reduced to 50%, the torque of the motor will become:

- (a) 50% of the previous value
- (b) 25% of the previous value
- (c) 150% of the previous value
- (d) 125% of the previous value

Ans: (b)

735. A 250 V dc motor has an armature resistance of 0.25Ω . It is drawing an armature current of 25A, driving a certain load. Calculate the induced emf in the motor under this condition.

- (a) 180.5 V
- (b) 243.75 V
- (c) 192.5 V
- (d) 625 V

Ans: (b)

736. Which of the following is the standard requirement of a dc armature winding?

- (a) It should be a closed one
- (b) It should be a lap winding
- (c) It should be a wave winding
- (d) It should be either a wave winding or a lap winding.

Ans: (a)

737. The poorest voltage regulation exists in case of which of the following generators?

- (a) Compound generators
- (b) Shunt generators
- (c) Series generators
- (d) High generators

Ans: (c)

738. What would be the value of pole pitch if there are 80 conductors and 8 poles?

- (a) 640
- (b) 64
- (c) 80
- (d) 10

Ans: (d)

739. What is the value of flux in the section of yoke, if the pole flux is ϕ weber?

- (a) 2ϕ
- (b) $\sqrt{\phi}$
- (c) $\phi/2$
- (d) ϕ

Ans: (c)

740. What is the relationship between the speed (N) and armature current (I_a) in case of a dc- series motor?

- (a) $N \propto I/I_a$
- (b) $N \propto \sqrt{I_a}$
- (c) $N \propto I_a$
- (d) $N \propto I_a$

Ans: (a)

741. The method of speed control of DC shunt motors used for applications where a very wide range sensitive speed control is required is:

- (a) Ward-Leonard System
- (b) Multiple Voltage Control
- (c) Tapped Field Control
- (d) Rheostatic Control

Ans: (a)

742. The DC shunt motor is running with a certain load. The effect of adding an external resistance in field circuit is to:

- (a) Increase the motor speed
- (b) Stop the motor
- (c) Reduce the motor speed
- (d) Reduce the armature current of the motor

Ans: (a)

743. In DC motor, the speed depends upon:

- (a) Applied voltage alone
- (b) Back emf alone
- (c) Back emf and flux
- (d) Flux only

Ans: (c)

744. Three point starter can be used for:

- (a) Both shunt and compound motors
- (b) Shunt motor only
- (c) Series motor only
- (d) Compound motor only

Ans: (a)

745. Voltage equation of DC motor is given by:

- (a) $V = E_b + I_a R_a$
- (b) $V = E_b - I_a R_a$
- (c) $V = E_b I_a - R_a$
- (d) $V = E_b I_a + R_a$

Ans: (a)

746. DC motor recommended for locomotive drive is:

- (a) DC series motor
- (b) DC long shunt compound motor
- (c) DC shunt motor
- (d) DC short shunt compound motor

Ans: (a)

747. Brushes are provided in DC machine for:

- (a) Smooth rotation
- (b) Preventing sparking
- (c) Providing a path for flow of current
- (d) Reducing the losses

Ans: (c)

748. The field poles and armature core of a dc generator are laminated in order to reduce

- (a) Hysteresis loss
- (b) Eddy current loss
- (c) Weight
- (d) Speed

Ans: (b)

749. The mechanical power developed in a dc motor is equal to

- (a) Power input - core losses
- (b) Power input - mechanical losses
- (c) Armature current x counter e.m.f.
- (d) Armature current x supply voltage

Ans: (c)

750. A 220 V dc shunt motor is running at 500 rpm when armature current is 50 A. The value of armature resistance is 0.2 ohm. The speed of motor at the double torque will be

- (a) 250 rpm
- (b) 500 rpm
- (c) 1000 rpm
- (d) 476 rpm

Ans: (d)

751. If numbers of poles in lap wound dc generator are doubled, the generated e.m.f. will be

- (a) Increased by a factor of 2
- (b) Decreased by a factor of 2
- (c) Increased by a factor of 4
- (d) Unchanged

Ans: (d)

752. A DC series motor has linear magnetization characteristics and negligible armature resistance. The motor speed is

- (a) Directly proportional to T
- (b) Inversely proportional to T
- (c) Directly proportional to T^2
- (d) Inversely proportional to T^2 where T = load torque

Ans: (b)

753. A 4-pole dc generator runs at 1500 rpm. The frequency of current in armature winding is

- (a) Zero
- (b) 25 Hz
- (c) 50 Hz
- (d) 100 Hz

Ans: (c)

754. For a dc series motor, which of the following expression is correct assuming torque (T) versus armature current (I_a) characteristics unsaturated?

- (a) $T \propto \sqrt{I_a}$
- (b) $T \propto I_a$
- (c) $T \propto -I_a$
- (d) $T \propto I_a^2$

Ans: (d)

755. A dc series motor should never be started at

- (a) Normal load condition.
- (b) Full load condition.
- (c) No load condition.
- (d) Slightly overload condition.

Ans: (c)

756. In a dc generator, 8 parallel paths and 16 brushes for collection of current are used. If voltage drop per brush is 1 V, then reduction in the induced e.m.f. will be

- (a) 2 V
- (b) 4 V
- (c) 8 V
- (d) 16 V

Ans: (d)

757. The speed control of dc shunt motor in both directions can be obtained by:

- (a) Armature resistance control method
- (b) Armature voltage control method
- (c) Field diverter method
- (d) Ward Leonard method

Ans: (d)

758. The armature resistance of a DC motor is 0.4Ω , the supply voltage is 200 V and the back e.m.f. is 198 V at full speed. The armature current is

- (a) 4A
- (b) 8A
- (c) 5A
- (d) 0.5A

Ans: (c)

759. If the speed of a DC machine is doubled and the flux remains constant, the generated e.m.f.

- (a) Remains the same
- (b) Is doubled
- (c) Is halved
- (d) Is thrice

Ans: (b)

760. If the total number of slots in a D. C machine is 25 and the total number of poles is 5, then what is the coil span of the machine?

- (a) 5
- (b) 30
- (c) 20
- (d) 125

Ans: (a)

761. To save energy during braking, which type of braking is used?

- (a) Regenerative
- (b) Plugging
- (c) Dynamic
- (d) All of these

Ans: (a)

762. Which of the following dc generators is employed in arc welding?

- (a) Shunt
- (b) Cumulative Compound
- (c) Series
- (d) Differential Compound

Ans: (d)

763. Which one acts as a mechanical rectifier in the process of converting AC current into DC

current where the emf is induced in the armature winding?

- (a) Rheostat
- (b) Rotor
- (c) Commutator
- (d) Stator

Ans: (c)

764. The speed control of DC shunt motor in both the directions can be obtained by

- (a) Armature resistance control method
- (b) Ward Leonard method
- (c) Field diverter method
- (d) Armature voltage control method

Ans: (b)

765. The speed of a D.C. Motor is directly proportional to

- (a) Armature current
- (b) Field current
- (c) Impressed voltage
- (d) Number of poles

Ans: (a)

766. A shunt generator gives the greatest voltage at

- (a) No-load
- (b) Full-load
- (c) Open field
- (d) Drooping

Ans: (a)

767. In D.C. generators, the cause of rapid brush wear may be

- (a) Severe sparking
- (b) Rough commutator surface
- (c) Imperfect contact
- (d) Any of the above

Ans: (d)

768. A separately excited generator as compared to a self-excited generator

- (a) Is enable to better voltage control
- (b) Is more stable
- (c) Has exciting current independent of load current
- (d) Has all above features

Ans: (d)

769. Iron losses in a D.C. machine are independent of variations in

- (a) Speed
- (b) Load
- (c) Voltage
- (d) Speed and voltage

Ans: (b)

770. Brushes of D.C. machines are made of

- (a) Carbon
- (b) Soft copper
- (c) Hard copper
- (d) All of the above

Ans: (a)

771. The residual magnetism of a self excited dc generator is lost. To build up its emf again the

- (a) Field winding must be replaced
- (b) Armature connection must be reversed
- (c) Field winding connections must be reversed
- (d) Field winding must be excited by low voltage DC supply

Ans: (d)

772. The insulating material used between the commutator segments is normally

- (a) Graphite
- (b) Paper
- (c) Mica
- (d) Insulating varnish

Ans: (c)

773. The function of pole shoes in the case of D.C. machine is

- (a) To reduce the reluctance of the magnetic path
- (b) To spread out the flux to achieve uniform flux density
- (c) To support the field coil
- (d) All the above functions

Ans: (d)

774. Separately excited and self-excited are types of which machine?

- (a) DC machine
- (b) Synchronous machine
- (c) Induction machine
- (d) None of the above

Ans: (a)

775. If speed of a d.c. shunt motor increases, the back emf -

- (a) Increases
- (b) decreases
- (c) Remains fixed
- (d) Decreases and then increases

Ans: (a)

776. Which part of DC machines converts the alternating current induced in armature conductors into unidirectional current in the external load circuit?

- (a) Commutator
- (b) Pole coils
- (c) Armature core
- (d) Armature windings

Ans: (a)

777. A 230 V DC motor takes a current of 40A and runs at 1100 r.p.m. If armature and shunt field resistances are 0.25Ω and 230Ω respectively the back emf will be:

- (a) 220.25 V
- (b) 110.25 V
- (c) 230.25 V
- (d) 115 V

Ans: (a)

778. A 220 V dc shunt motor is running at 500 rpm when armature current is 50A. The value of armature resistance is 0.2 ohm. The speed of motor at the double torque will be

- (a) 250 rpm
- (b) 500 rpm
- (c) 1000 rpm
- (d) 476 rpm

Ans: (d)

779. With the increase in speed of a DC motor

- (a) Both back emf as well as line current increase
- (b) Both back emf as well as line current fall
- (c) Back emf increases but line current fall
- (d) Back emf fall and line current increases

Ans: (c)

780. The torque-speed characteristic of a D.C. shunt motor is

- (a) A rectangular hyperbola
- (b) A drooping straight line
- (c) A parabola
- (d) None of the above

Ans: (b)

781. Variation in speed by Ward-Leonard control method of D.C. motors occurs due to variation in

- (a) Field excitation
- (b) Armature current
- (c) Armature voltage
- (d) Supply Voltage

Ans: (c)

782. Ward-Leonard system of speed control is NOT recommended for:

- (a) Frequent motor reversals
- (b) Very low speeds
- (c) Constant speed operation
- (d) Wide speed range

Ans: (c)

783. Which of the following statement is WRONG regarding cumulative compound Motor?

- (a) Variable speed
- (b) Low starting torque
- (c) Speed control possible
- (d) Adjustable varying speed

Ans: (b)

784. Drop in alternator frequency is corrected by:

- (a) Damper winding
- (b) Increased prime mover output
- (c) Automatic voltage regulator
- (d) None of these

Ans: (b)

785. ZPF (Zero power factor) method finds _____ of an alternator.

- (a) Voltage regulation
- (b) Efficiency
- (c) Armature resistance
- (d) Synchronous impedance

Ans: (a)

786. By reversing the direction of rotation of a synchronous motor can be reversed.

- (a) Supply phase sequence
- (b) Current to the field winding
- (c) Polarity of rotor poles
- (d) Either "polarity of rotor poles" or "supply phase sequence".

Ans: (a)

787. An alternator's operating principle is quite similar to that of:

- (a) A.C. Generator
- (b) D.C. Generator
- (c) A.C. Inverter
- (d) A.C. Stabilizer

Ans: (b)

788. What is the value of load angle at a point where power output of a salient pole synchronous generator is maximum?

- (a) 0°
- (b) 45°
- (c) 120°
- (d) It is less than 90° but not fixed

Ans: (d)

789. When a synchronous motor is it operates with leading power factor current.

- (a) Under-excited
- (b) Critically excited
- (c) Over-excited
- (d) Heavily loaded

Ans: (c)

790. What will be the effect on a salient pole synchronous motor if its field current is switched off (provided the motor runs at no load)?

- (a) It will stop
- (b) It continues to run at synchronous speed
- (c) It continues to run at a speed slightly more than the synchronous speed
- (d) It continues to run at a speed slightly less than the synchronous speed

Ans: (b)

791. The following system is used in connections of various lamps and appliances in parallel. Identify the system.

- (a) Gain-in-system
- (b) Loop-in-system
- (c) Voltage-in-system
- (d) Parallel-in-system

Ans: (b)

792. On which of the following parameters does the power factor of an alternator depend?

- (a) Load
- (b) Speed of rotor
- (c) Core losses
- (d) Armature losses

Ans: (a)

793. What is the purpose of dampers in a large generator?

- (a) They increase stability
- (b) They reduce voltage fluctuations
- (c) They reduce frequency fluctuations
- (d) They decrease stability.

Ans: (a)

794. For the following specifications of a synchronous motor, determine the ratio of no load speed to full load speed.

- (a) 2 :3
- (b) 1 :1
- (c) 3 :5
- (d) 2 :7

Ans: (b)

795. Let us assume that two alternators running exactly in synchronism. Find the synchronizing power of the system.

- (a) 0
- (b) 1
- (c) 0.8
- (d) 0.5

Ans: (a)

796. Damping winding in a synchronous motor:

- (a) Improves power factor of the motor
- (b) Increases hunting of the motor
- (c) Reduces windage losses
- (d) Increases starting torque

Ans: (d)

797. The direction of induced e.m.f. can be found with the help of

- (a) Fleming's right hand rule
- (b) Kirchhoff's voltage law
- (c) Lenz's law
- (d) Laplace's law

Ans: (a)

798. A 50 Hz alternator will run at the highest speed if it is wound for

- (a) 8 poles
- (b) 6 poles
- (c) 4 poles
- (d) 2 poles

Ans: (d)

799. Which one of the following methods gives voltage regulation higher than the actual value in an

alternator ?

- (a) ZPF method
- (b) mmf method
- (c) emf method
- (d) ASA method

Ans: (c)

800. The most common type of prime mover used for low speed alternators is

- (a) Steam turbine
- (b) Petrol engine
- (c) Hydraulic turbine
- (d) Diesel engine

Ans: (c)

801. When speed of an alternator is changed from 3600 rpm to 1800 rpm, the generated emf will be

- (a) One-half
- (b) Twice
- (c) One-fourth
- (d) Four times

Ans: (a)

802. The power factor of an alternator is determined by its

- (a) Prime mover
- (b) Speed
- (c) Excitation
- (d) Load

Ans: (d)

803. Two mechanically coupled alternators deliver power at 50 Hz and 60 Hz respectively. The highest speed of alternators is

- (a) 600 rpm
- (b) 500 rpm
- (c) 3000 rpm
- (d) 3600 rpm

Ans: (a)

804. From no-load to full-load, synchronous motors give:

- (a) Constant speed
- (b) Variable speed
- (c) Gradually increasing speed
- (d) Gradually decreasing speed

Ans: (a)

805. Alternators are rated at:

- (a) kW
- (b) kVA
- (c) kVA or kW
- (d) kWh

Ans: (b)

806. To reduce the peripheral speed of an alternator, diameter of the rotor is:

- (a) Increased
- (b) Decreased
- (c) Increased or decreased
- (d) Kept same

Ans: (b)

807. Which of the following statement is false?

- (a) Silica gel is used in transformers
- (b) Transformer is a constant flux machine
- (c) Induction motor can be self starting
- (d) Synchronous motor is self starting

Ans: (d)

808. The size of a synchronous motor decreases with the increase in

- (a) Speed
- (b) Horse power rating
- (c) Flux density
- (d) All of these

Ans: (c)

809. What will be the rotation speed of a 3-phase, 4- pole, 50 Hz synchronous motor, if the frequency number of poles and load torque is halved?

- (a) 3000 RPM
- (b) 750 RPM
- (c) 6000 RPM
- (d) 1500 RPM

Ans: (d)

810. Stator and rotor fields rotate simultaneously in which of the following motors?

- (a) Universal motor
- (b) Synchronous motor
- (c) D.C. motor
- (d) Reluctance motor

Ans: (b)

811. In which of the following conditions will a 3-phase synchronous machine works as a capacitor?

- (a) Over Excited
- (b) Critically Excited
- (c) Under Excited
- (d) None of these

Ans: (a)

812. What is the role of alternator in a steam power station?

- (a) It converts electrical energy into mechanical energy
- (b) It converts heat energy to mechanical energy
- (c) It converts heat energy to electrical energy
- (d) It converts mechanical energy into electrical energy

Ans: (d)

813. What is the Synchronising power of a synchronous machine?

- (a) Directly proportional to the synchronous reactance
- (b) Equal to the synchronous reactance
- (c) Inversely proportional to the synchronous reactance
- (d) None of these

Ans: (c)

814. What the damper bars develops, when the rotor speed, in a synchronous machine, becomes more than the synchronous speed during hunting?

- (a) Inductor motor torque
- (b) Induction generator torque
- (c) D.C. motor torque
- (d) Synchronous motor torque

Ans: (b)

815. A synchronous motor can operate at

- (a) Lagging power factor only
- (b) Lagging, leading and unity power factors
- (c) Leading power factor only
- (d) None of these

Ans: (b)

816. According to Fleming's right hand rule, what does the thumb indicate?

- (a) Direction of the motion of the conductor relative to the magnetic field
- (b) Direction of the induced or generated current within the conductor
- (c) Direction of the magnetic field
- (d) None of these

Ans: (a)

817. The constant speed of a synchronous motor can be changed to new fixed value by which of the following methods?

- (a) By changing the applied voltage
- (b) By interchanging any two phases
- (c) By changing the supply frequency
- (d) All of these

Ans: (c)

818. Which of the following generator is used in the thermal power plant?

- (a) Turbo generator
- (b) Synchronous motor
- (c) Non-salient pole synchronous generator
- (d) Salient pole synchronous generator

Ans: (c)

819. Calculate the frequency in Hz of a 10-pole AC generator which rotates at 1800 rpm.

- (a) 120
- (b) 100
- (c) 150
- (d) 180

Ans: (c)

820. If field current of a three phase alternator is reversed, what happens to its phase sequence?

- (a) Remains same
- (b) Reverses
- (c) Two phases are exchanged
- (d) It becomes ac motor

Ans: (a)

821. A 10 pole, 25 Hz alternator is directly coupled to and is driven by 60 Hz synchronous motor. Then the number of poles in a synchronous motor is

- (a) 12 poles
- (b) 48 poles
- (c) 24 poles
- (d) 6 poles

Ans: (c)

822. Which of the following phenomenon shows the regulation of an alternator?

- (a) The increase in terminal voltage when load is thrown off
- (b) The variation of terminal voltage under the conditions of over and under excitation
- (c) Terminal voltage at zero power factor
- (d) The reduction in terminal voltage when alternator is on full load

Ans: (a)

823. The synchronous motor has

- (a) Constant speed
- (b) Variable speed
- (c) Constant poles
- (d) Constant size

Ans: (a)

824. Which of the following motors one will choose to drive the rotary compressor?

- (a) D.C. shunt motor
- (b) D. C. series motor
- (c) Universal motor
- (d) Synchronous motor

Ans: (d)

825. Negative voltage regulation is indicative that the load is

- (a) Capacitive only
- (b) Inductive only
- (c) Inductive or resistive
- (d) None of the above

Ans: (a)

826. As load p.f. of an alternator becomes more leading, the value of generated voltage required to give rated terminal voltage

- (a) Increases
- (b) Remains unchanged
- (c) Decreases
- (d) Varies with rotor speed

Ans: (c)

827. Synchronous condenser means

- (a) A synchronous motor with capacitor connected across stator terminals to improve PF
- (b) A synchronous motor operating at full load with leading PF
- (c) An over excited synchronous motor partially supplying mechanical load and also improving PF of the system to which it is connected
- (d) An over excited synchronous motor operating at no load with leading PF to improve the PF of the system

Ans: (d)

828. In alternators during armature reaction the effect of armature flux on main flux with unity power factor is:

- (a) Cross magnetising
- (b) Wholly demagnetising
- (c) Partially magnetising
- (d) Wholly magnetising

Ans: (a)

829. An integral number of slots per pole is often used in an alternator in order to:

- (a) Eliminate harmonics in the waveform
- (b) Provide insulation
- (c) Permit easy installation of stator coils
- (d) Provide easy removal in case of repair

Ans: (a)

830. Damper in a large generator is used to:

- (a) Increase stability
- (b) Reduce voltage fluctuation
- (c) Reduce frequency fluctuation
- (d) All above

Ans: (a)

831. Harmonics present in alternators affect:

- (a) Pitch factor
- (b) Chording factor
- (c) Neither Chording factor nor pitch factor
- (d) Chording factor and pitch factor

Ans: (d)

832. Synchronous generator can reactive power:

- (a) Neither generates nor absorbs
- (b) Absorb
- (c) Generate and absorb
- (d) Generate

Ans: (c)

833. An alternator has:

- (a) Rotating armature and stationary field
- (b) Stationary armature and stationary field.
- (c) Rotating armature and rotating field
- (d) Stationary armature and rotating field

Ans: (d)

834. To determine voltage regulation of an alternator the following experimental results are required:

- (a) Short circuit characteristic and open circuit characteristic
- (b) Open circuit characteristic and armature impedance
- (c) Armature impedance
- (d) Short circuit characteristic and open circuit characteristic and Armature impedance

Ans: (d)

835. To reduce the peripheral speed of an alternator, diameter of the rotor is:

- (a) Increased
- (b) Decreased
- (c) Increased or decreased
- (d) Kept same

Ans: (b)

836. What is the frequency of voltage generated by an alternator having 6-poles and rotating at 900 rpm?

- (a) 50 rad/s
- (b) 50 Hz
- (c) 45 Hz
- (d) 45 rad/s

Ans: (c)

837. The speed of two pole alternator at 60 Hz is-

- (a) 3600 rpm
- (b) 750 rpm
- (c) 300 rpm
- (d) 1500 rpm

Ans: (a)

838. The distribution or winding factor is defined in an alternator in terms of-

- (a) Power factor
- (b) Electromotive force
- (c) Power
- (d) Current

Ans: (b)

839. In case of leading load power factor, the terminal voltage of an alternator will

- (a) Fall on removing the full load
- (b) Rise on removing the full load
- (c) Rise on adding the full load
- (d) Fall on adding the full load

Ans: (a)

840. A magnetic flux of 300 m Wb in a coil of 100 turns is reverted in 0.2 seconds. The average emf induced is

- (a) 600 V
- (b) -300 V
- (c) -600 V
- (d) 300 V

Ans: (d)

841. Distributed winding and short chording employed in AC machines will result in;
- (a) Reduction in both emf and harmonics emf
 - (b) Reduction in emf and increase in harmonics emf
 - (c) Increase in both emf and harmonics emf
 - (d) Increase in emf and reduction in harmonics emf

Ans: (a)

842. An alternator has a phase sequence of RYB for its phase voltages. In case the field current is reversed the phase sequence will become:

- (a) RBY
- (b) RYB
- (c) YRB
- (d) None of the above

Ans: (b)

843. What is the pitch factor of a 4 pole alternator having 36 slots and a coil span of 1 to 8 ?

- (a) 140°
- (b) 80°
- (c) 20°
- (d) 40°

Ans: (d)

844. A 3 Phase, 60 Hz generator connected in Y connection, generated a line to line voltage of 23900V Calculate the peak line voltage.

- (a) 13800 V
- (b) 33800 V
- (c) 42300 V
- (d) 23900 V

Ans: (b)

845. An alternator is feeding an infinite bus bar. Its prime mover is suddenly shutdown. The alternator will:

- (a) Continue to work as alternator but the direction of rotation will reverse.
- (b) Come to stand still
- (c) Continue to work as synchronous motor and direction of rotation will also be same
- (d) Will work as an induction motor

Ans: (c)

846. An alternator is connected to an infinite bus. If its field current is decreased then its armature current will be-

- (a) Increase with zero pf lagging
- (b) Decreases with zero pf leading
- (c) Increases with zero pf leading
- (d) None of the other options

Ans: (c)

847. A synchronous generator has higher power handling capacity when operating -----
- (a) At lagging power factor
 - (b) At leading power factor
 - (c) At unity power factor
 - (d) Independent of power factor

Ans: (c)

848. A 6 pole, 3-phase alternator running at 1000 rpm supplies to an 8-pole, 3-phase induction motor which has a rotor current of frequency 2 Hz. The speed at which the motor operates is:-
- (a) 100 rpm
 - (b) 970 rpm
 - (c) 750 rpm
 - (d) 720 rpm

Ans: (b)

849. Maximum speed of a synchronous machine for 50 Hz is:
- (a) 1500 rpm
 - (b) 3000 rpm
 - (c) 20000 rpm
 - (d) 30000 rpm

Ans: (b)

850. We have assigned a frequency of 50 Hz to power system because it
- (a) Can be easily obtained
 - (b) Gives best result when used for operating both lights and machinery
 - (c) Easy calculations
 - (d) None

Ans: (b)

851. Direction of the alternating e.m.f. produced in the stator conductors of an alternator is given by:
- (a) Lenz's law
 - (b) Flemings left hand rule
 - (c) Fleming's right hand rule
 - (d) Kirchhoff's Law

Ans: (c)

852. On which of the following parameters does the power factor of an alternator depend?
- (a) Load
 - (b) Speed of rotor
 - (c) Core losses
 - (d) Armature losses

Ans: (a)

853. The integration of a three phase Alternator with the infinite grid requires which quantities to be the same?

- (a) Voltage
- (b) Frequency
- (c) Phase sequence
- (d) All of the above

Ans: (d)

854. The main disadvantage with Nickel-Cadmium cells is

- (a) They have a high-energy density
- (b) They can be recharged more times than other types of rechargeable batteries
- (c) They have to be fully discharged before charging, because they suffer from a memory effect
- (d) All the above

Ans: (c)

855. _____ works on the chemical effects of current

- (a) Power factor meter
- (b) Voltmeter
- (c) DC ampere hour meter
- (d) Wattmeter

Ans: (c)

856. Which of the following batteries does not require trickle charging?

- (a) Lead acid cell
- (b) Alkaline cell
- (c) Lead acid and Alkaline cell both
- (d) Neither lead acid nor alkaline cell

Ans: (b)

857. The most common used primary cell is

- (a) Lithium cell
- (b) Nickel iron cell
- (c) Lead acid cell
- (d) Nickel cadmium cell

Ans: (a)

858. In dry cells, electrons are released at

- (a) Cathode and anode both
- (b) Outside the electrolyte chamber
- (c) Anode
- (d) Cathode

Ans: (c)

859. Salt solutions are
(a) Insulators
(b) Semi-conductors
(c) Good conductors of electricity
(d) Do not possess electrical properties
Ans: (c)

860. Positive Electrode of a dry cell is made of
(a) Copper
(b) Carbon
(c) Zinc
(d) Sulphur
Ans: (b)

861. Generally the Leclanche cell is used for
(a) Continuous purposes
(b) Heavy purposes
(c) Low purposes
(d) Intermittent purposes
Ans: (d)

862. A solar cell is
(a) Same as photometer
(b) Same as a photo emissive cell
(c) Same as photo conductive cell
(d) Same as photo voltatic cell
Ans: (d)

863. Internal resistance of a cell depends on
(a) Terminal voltage
(b) Torque
(c) Current
(d) Area of the plates
Ans: (d)

864. What will be the energy used by the battery if the battery has to deliver 6.28×10^{18} electrons with potential difference of 20 V across the terminal?
(a) 5 J
(b) 10 J
(c) 15 J
(d) 20 J
Ans: (d)

865. The usable capacity of a battery-----
- (a) Increases with increased discharge current
 - (b) Decreases with increased discharge current
 - (c) Is independent of discharge current
 - (d) Depends on discharge time

Ans: (b)

866. Which one of the following sources of energy does a fuel cell consist of ?
- (a) Hydrogen
 - (b) Electrical storage
 - (c) Natural gas
 - (d) Petroleum

Ans: (a)

867. When a lead acid cell is recharged:
- (a) The anode becomes dark chocolate brown colour
 - (b) Voltage rises
 - (c) Energy is absorbed by the cell
 - (d) All of these

Ans: (d)

868. A 6V battery is connected to 300Ω load. Under these conditions, it is rated at 40 Ah. How long can it supply current to the load?
- (a) 1000 h
 - (b) 2000 h
 - (c) 200 h
 - (d) 4000 h

Ans: (b)

869. Petroleum jelly is applied to the terminals of the lead acid battery in order to prevent.
- (a) Corrosion
 - (b) Local heating
 - (c) Short-circuiting
 - (d) All of these

Ans: (a)

870. Trickle charging of storage battery helps to
- (a) Prevent sulphation
 - (b) Keep it fresh and fully charged
 - (c) Maintain proper electrolyte level
 - (d) Increase its reverse capacity

Ans: (b)

871. The term ampere-hour (Ah) is associated with

- (a) Rectifiers
- (b) Transformers
- (c) Electromagnets
- (d) Storage cells

Ans: (d)

872. Cells are connected in series in order increase the

- (a) Current capacity
- (b) Life of the cells
- (c) Voltage rating
- (d) Terminal voltage

Ans: c

873. The emf of a cell depends upon

- (a) The internal resistance
- (b) External resistance
- (c) Electrolyte and electrodes of the cell
- (d) None of the factors

Ans: (a)

874. What is the name of the instrument used to measure the specific density of a battery electrolyte

- (a) Pyrometer
- (b) Hydrometer
- (c) Lactometer
- (d) Fuel gauge

Ans: (b)

875. Which of the following primary cell has the lowest voltage?

- (a) Lithium
- (b) Zinc-chloride
- (c) Mercury
- (d) Carbon-zinc

Ans: (c)

876. The active materials of a nickel-iron battery are

- (a) Nickel hydroxide
- (b) 21 % solution of KOH
- (c) Powdered iron and its oxide
- (d) All of the above

Ans: (d)

- 877.** During discharging of lead acid cells, the terminal voltage decrease with the decrease in
(a) Temperature
(b) Discharge rate
(c) State of charge
(d) None of these

Ans: (b)

- 878.** The process of coating of a metallic surface with a harder metal by electro-deposition is known as:
(a) Electrofacing
(b) Electro ionisation
(c) Electrometallisation
(d) Electroforming

Ans: (a)

- 879.** The function of the reference electrode in a pH meter is so
(a) Produce a constant voltage
(b) Provide temperature compensation
(c) Provide a constant current
(d) Measure average pH value

Ans: (a)

- 880.** How can we measure the battery capacity in SI units?
(a) Wh
(b) Ah
(c) kWh
(d) Vh

Ans: (b)

- 881.** Discharging of a battery
(a) Reduces specific gravity of the electrolyte
(b) Increases specific gravity of the electrolyte
(c) Produces excessive gassing
(d) Increases the temperature

Ans: (a)

- 882.** When cells are arranged in parallel:
(a) Current capacity increases
(b) Current capacity decreases
(c) The e.m.f. increases
(d) The e.m.f. decreases

Ans: (a)

- 883.** A battery has a short circuit current 30 A and open circuit voltage of 24 V. If the battery is connected to an electric bulb of resistance 2Ω , the power dissipated by the bulb is:
- (a) 80 W
 - (b) 1800 W
 - (c) 112.5 W
 - (d) 147 W
- Ans: (d)**

III. ELECTRICAL SYSTEMS AND COMPONENTS

- 884.** The insulating material for a cable should have
- A. low cost
 - B. high dielectric strength
 - C. high mechanical strength
 - D. all of the above
- Answer: D**
- 885.** Which of the following protects a cable against mechanical injury ?
- A. Bedding
 - B. Sheath
 - C. Armouring
 - D. None of the above
- Answer: C**
- 886.** Which of the following insulation is used in cables ?
- A. Varnished cambric
 - B. Rubber
 - C. Paper
 - D. All of the above
- Answer: D**
- 887.** Empire tape is
- A. varnished cambric
 - B. vulcanised rubber
 - C. impregnated paper
 - D. none of the above
- Answer: A**
- 888.** The thickness of the layer of insulation on the conductor, in cables, depends upon
- A. reactive power
 - B. power factor
 - C. voltage
 - D. current carrying capacity
- Answer: C**

889. The bedding on a cable consists of

- A. hessian cloth
- B. jute
- C. All of the above
- D. none of the above

Answer: C

890. The insulating material for cables should

- A. be acid proof
- B. be non-inflammable
- C. be non-hygroscopic
- D. have all above properties

Answer: D

891. In a cable immediately above metallic sheath _____ is provided.

- A. earthing connection
- B. bedding
- C. armouring
- D. none of the above

Answer: B

892. The current carrying capacity of cables in D.C. is more than that in A.C. mainly due to

- A. absence of harmonics
- B. non-existence of any stability limit
- C. smaller dielectric loss
- D. absence of ripples

Answer: C

893. In case of three core flexible cable the colour of the neutral is

- A. blue
- B. black
- C. brown
- D. none of the above

Answer: A

894. cables are used for 132 kV lines.

- A. High tension
- B. Super tension
- C. Extra high tension
- D. Extra super voltage

Answer: D

895. Conduit pipes are normally used to protect _____ cables.

- A. unsheathed cables
- B. armoured
- C. PVC sheathed cables
- D. all of the above

Answer: A

896. The minimum dielectric stress in a cable is at

- A. armour
- B. bedding
- C. conductor surface
- D. lead sheath

Answer: D

897. In single core cables armouring is not done to

- A. avoid excessive sheath losses
- B. make it flexible
- C. either of the above
- D. none of the above

Answer: A

898. Dielectric strength of rubber is around

- A. 5 kV/mm
- B. 15 kV/mm
- C. 30 kV/mm
- D. 200 kV/mm

Answer: C

899. Low tension cables are generally used up to

- A. 200 V
- B. 500 V
- C. 700 V
- D. 1000 V

Answer: D

900. In a cable, the maximum stress under operating conditions is at

- A. insulation layer
- B. sheath
- C. armour
- D. conductor surface

Answer: D

901. High tension cables are generally used up to

- A. 11kV
- B. 33kV
- C. 66 kV
- D. 132 kV

Answer: A

902. The surge resistance of cable is

- A. 5 ohms
- B. 20 ohms
- C. 50 ohms
- D. 100 ohms

Answer: C

903. PVC stands for

- A. polyvinyl chloride
- B. post varnish conductor
- C. pressed and varnished cloth
- D. positive voltage conductor

Answer: A

904. In the cables, the location of fault is usually found out by comparing

- A. the resistance of the conductor
- B. the inductance of conductors
- C. the capacitances of insulated conductors
- D. all above parameters

Answer: C

905. In capacitance grading of cables we use a _____ dielectric.

- A. composite
- B. porous
- C. homogeneous
- D. hygroscopic

Answer: A

906. Pressure cables are generally not used beyond

- A. 11 kV
- B. 33 kV
- C. 66 kV
- D. 132 kV

Answer: C

907. The material for armouring on cable is usually

- A. steel tape
- B. galvanised steel wire
- C. any of the above
- D. none of the above

Answer: C

908. Cables, generally used beyond 66 kV are

- A. oil filled
- B. S.L. type
- C. belted
- D. armoured

Answer: A

909. The relative permittivity of rubber is

- A. between 2 and 3
- B. between 5 and 6
- C. between 8 and 10
- D. between 12 and 14

Answer: A

910. Solid type cables are considered unreliable beyond 66 kV because

- A. insulation may melt due to higher temperature
- B. skin effect dominates on the conductor
- C. of corona loss between conductor and sheath material
- D. there is a danger of breakdown of insulation due to the presence of voids

Answer: D

911. If the length of a cable is doubled, its capacitance

- A. becomes one-fourth
- B. becomes one-half
- C. becomes double
- D. remains unchanged

Answer: C

912. In cables the charging current

- A. lags the voltage by 90°
- B. leads the voltage by 90°
- C. lags the voltage by 180°
- D. leads the voltage by 180°

Answer: B

- 913. A certain cable has an insulation of relative permittivity 4. If the insulation is replaced by one of relative permittivity 2, the capacitance of the cable will become**
- A. one half
 - B. double
 - C. four times
 - D. none of the above

Answer: A

- 914. If a cable of homogeneous insulation has a maximum stress of 10 kV/mm, then the dielectric strength of insulation should be**
- A. 5 kV/mm
 - B. 10 kV/mm
 - A. 15 kV/mm
 - D. 30 kV/mm

Answer: B

- 915. In the cables, sheaths are used to**
- A. prevent the moisture from entering the cable
 - B. provide enough strength
 - C. provide proper insulation
 - D. none of the above

Answer: A

- 916. The inter sheaths in the cables are used to**
- A. minimize the stress
 - B. avoid the requirement of good insulation
 - C. provide proper stress distribution
 - D. none of the above

Answer: C

- 917. The electrostatic stress in underground cables is**
- A. same at the conductor and the sheath
 - B. minimum at the conductor and maximum at the sheath
 - C. maximum at the conductor and minimum at the sheath
 - D. zero at the conductor as well as on the sheath

Answer: C

- 918. The breakdown of insulation of the cable can be avoided economically by the use of**
- A. inter-sheaths
 - B. insulating materials with different dielectric constants
 - C. both A. and B.
 - D. none of the above

Answer: C

- 919. The insulation of the cable decreases with**
A. the increase in length of the insulation
B. the decrease in the length of the insulation
C. either A. or B.
D. none of the above

Answer: A

- 920. A cable carrying alternating current has**
A. hysteresis losses only
B. hysteresis and leakage losses only
C. hysteresis, leakage and copper losses only
D. hysteresis, leakage, copper and friction losses

Answer: B

- 921. In a cable the voltage stress is maximum at**
A. sheath
B. insulator
C. surface of the conductor
D. core of the conductor

Answer: D

- 922. Capacitance grading of cable implies**
A. use of dielectrics of different permeabilities
B. grading according to capacitance of cables per km length
C. cables using single dielectric in different concentrations
D. capacitance required to be introduced at different lengths to counter the effect of inductance

Answer: A

- 923. Underground cables are laid at sufficient depth**
A. to minimise temperature stresses
B. to avoid being unearthed easily due to removal of soil
C. to minimise the effect of shocks and vibrations due to gassing vehicles, etc.
D. for all of the above reasons

Answer: C

- 924. The advantage of cables over overhead transmission lines is**
A. easy maintenance
B. low cost
C. can be used in congested areas
D. can be used in high voltage circuits

Answer: C

925. The thickness of metallic shielding on cables is usually

- A. 0.04 mm
- B. 0.2 to 0.4 mm
- C. 3 to 5 mm
- D. 40 to 60 mm

Answer: A

926. Cables for 220 kV lines are invariably

- A. mica insulated
- B. paper insulated
- C. compressed oil or compressed gas insulated
- D. rubber insulated

Answer: C

927. Is a cable is to be designed for use on 1000 kV, which insulation would you prefer ?

- A. Polyvinyle chloride
- B. Vulcanised rubber
- C. Impregnated paper
- D. Compressed SFe gas

Answer: D

928. If a power cable and a communication cable are to run parallel the minimum distance between the two, to avoid interference, should be

- A. 2 cm
- B. 10 cm
- C. 50 cm
- D. 400 cm

Answer: C

929. Copper as conductor for cables is used as

- A. annealed
- B. hardened and tempered
- C. hard drawn
- D. alloy with chromium

Answer: A

930. The insulating material should have

- A. low permittivity
- B. high resistivity
- C. high dielectric strength
- D. all of the above

Answer: D

931. The advantage of oil filled cables is

- A. more perfect impregnation
- B. smaller overall size
- C. no ionisation, oxidation and formation of voids
- D. all of the above

Answer: D

932. The disadvantage with paper as insulating material is

- A. it is hygroscopic
- B. it has high capacitance
- C. it is an organic material
- D. none of the above

Answer: A

933. The breakdown voltage of a cable depends on

- A. presence of moisture
- B. working temperature
- C. time of application of the voltage
- D. all of the above

Answer: D

934. Which of the following does not change in a transformer ?

- (a) Current
- (b) Voltage
- (c) Frequency
- (d) All of the above

Answer: c

935. In a transformer the energy is conveyed from primary to secondary

- (a) through cooling coil
- (b) through air
- (c) by the flux
- (d) none of the above

Answer: c

936. A transformer core is laminated to

- (a) reduce hysteresis loss
- (b) reduce eddy current losses
- (c) reduce copper losses
- (d) reduce all above losses

Answer: b

937. The degree of mechanical vibrations produced by the laminations of a transformer depends on

- (a) tightness of clamping
- (b) gauge of laminations
- (c) size of laminations
- (d) all of the above

Answer: d

938. The no-load current drawn by transformer is usually what per cent of the full-load current ?

- (a) 0.2 to 0.5 per cent
- (b) 2 to 5 per cent
- (c) 12 to 15 per cent
- (d) 20 to 30 per cent

Answer: b

939. The path of a magnetic flux in a transformer should have

- (a) high resistance
- (b) high reluctance
- (c) low resistance
- (d) low reluctance

Answer: d

940. No-load on a transformer is carried out to determine

- (a) copper loss
- (b) magnetising current
- (c) magnetising current and loss
- (d) efficiency of the transformer

Answer: c

941. The dielectric strength of transformer oil is expected to be

- (a) 1kV
- (b) 33 kV
- (c) 100 kV
- (d) 330 kV

Answer: b

942. Sumpner's test is conducted on trans-formers to determine

- (a) temperature
- (b) stray losses
- (c) all-day efficiency
- (d) none of the above

Answer: a

943. The permissible flux density in case of cold rolled grain oriented steel is around

- (a) 1.7 Wb/m²
- (b) 2.7 Wb/m²
- (c) 3.7 Wb/m²
- (d) 4.7 Wb/m²

Answer: a

944. The efficiency of a transformer will be maximum when

- (a) copper losses = hysteresis losses
- (b) hysteresis losses = eddy current losses
- (c) eddy current losses = copper losses
- (d) copper losses = iron losses

Answer: d

945. No-load current in a transformer

- (a) lags behind the voltage by about 75°
- (b) leads the voltage by about 75°
- (c) lags behind the voltage by about 15°
- (d) leads the voltage by about 15°

Answer: a

946. The purpose of providing an iron core in a transformer is to

- (a) provide support to windings
- (b) reduce hysteresis loss
- (c) decrease the reluctance of the magnetic path
- (d) reduce eddy current losses

Answer: c

947. Which of the following is not a part of transformer installation ?

- (a) Conservator
- (b) Breather
- (c) Buchholz relay
- (d) Exciter

Answer: d

948. While conducting short-circuit test on a transformer the following side is short circuited

- (a) High voltage side
- (b) Low voltage side
- (c) Primary side
- (d) Secondary side

Answer: b

949. In the transformer following winding has got more cross-sectional area

- (a) Low voltage winding
- (b) High voltage winding
- (c) Primary winding
- (d) Secondary winding

Answer: a

950. A transformer transforms

- (a) voltage
- (b) current
- (c) power
- (d) frequency

Answer: c

951. A transformer cannot raise or lower the voltage of a D.C. supply because

- (a) there is no need to change the D.C. voltage
- (b) a D.C. circuit has more losses
- (c) Faraday's laws of electromagnetic induction are not valid since the rate of change of flux is zero
- (d) none of the above

Answer: c

952. Primary winding of a transformer

- (a) is always a low voltage winding
- (b) is always a high voltage winding
- (c) could either be a low voltage or high voltage winding
- (d) none of the above

Answer: c

953. 20. Which winding in a transformer has more number of turns ?

- (a) Low voltage winding
- (b) High voltage winding
- (c) Primary winding
- (d) Secondary winding

Answer: b

954. Efficiency of a power transformer is of the order of

- (a) 100 per cent
- (b) 98 per cent
- (c) 50 per cent
- (d) 25 per cent

Answer: b

955. In a given transformer for given applied voltage, losses which remain constant irrespective of load changes are

- (a) friction and windage losses
- (b) copper losses
- (c) hysteresis and eddy current losses
- (d) none of the above

Answer: c

956. A common method of cooling a power transformer is

- (a) natural air cooling
- (b) air blast cooling
- (c) oil cooling
- (d) any of the above

Answer: c

957. The no load current in a transformer lags behind the applied voltage by an angle of about

- (a) 180°
- (b) 120°
- (c) 90°
- (d) 75°

Answer: d

958. In a transformer routine efficiency depends upon

- (a) supply frequency
- (b) load current
- (c) power factor of load
- (d) both (b) and (c)

Answer: d

959. In the transformer the function of a conservator is to

- (a) provide fresh air for cooling the transformer
- (b) supply cooling oil to transformer in time of need
- (c) protect the transformer from damage when oil expands due to heating
- (d) none of the above

Answer: c

960. Natural oil cooling is used for transformers up to a rating of

- (a) 3000 kVA
- (b) 1000 kVA
- (c) 500 kVA
- (d) 250 kVA

Answer: a

961. Power transformers are designed to have maximum efficiency at

- (a) nearly full load
- (b) 70% full load
- (c) 50% full load
- (d) no load

Answer: a

962. The maximum efficiency of a distribution transformer is

- (a) at no load
- (b) at 50% full load
- (c) at 80% full load
- (d) at full load

Answer: b

963. Transformer breaths in when

- (a) load on it increases
- (b) load on it decreases
- (c) load remains constant
- (d) none of the above

Answer: b

964. No-load current of a transformer has

- (a) has high magnitude and low power factor
- (b) has high magnitude and high power factor
- (c) has small magnitude and high power factor
- (d) has small magnitude and low power factor

Answer: d

965. Spacers are provided between adjacent coils

- (a) to provide free passage to the cooling oil
- (b) to insulate the coils from each other
- (c) both (a) and (b)
- (d) none of the above

Answer: a

966. Greater the secondary leakage flux

- (a) less will be the secondary induced e.m.f.
- (b) less will be the primary induced e.m.f.
- (c) less will be the primary terminal voltage
- (d) none of the above

Answer: a

967. The purpose of providing iron core in a step-up transformer is

- (a) to provide coupling between primary and secondary
- (b) to increase the magnitude of mutual flux
- (c) to decrease the magnitude of magnetizing current
- (d) to provide all above features

Answer: c

968. The power transformer is a constant

- (a) voltage device
- (b) current device
- (c) power device
- (d) main flux device

Answer: d

969. Two transformers operating in parallel will share the load depending upon their

- (a) leakage reactance
- (b) per unit impedance
- (c) efficiencies
- (d) ratings

Answer: b

970. If R_2 is the resistance of secondary winding of the transformer and K is the transformation ratio then the equivalent secondary resistance referred to primary will be

- (a) R_2/VK
- (b) R_2/K^2
- (c) R_2/K
- (d) R_2/K^2

Answer: b

971. What will happen if the transformers working in parallel are not connected with regard to polarity ?

- (a) The power factor of the two transformers will be different from the power factor of common load
- (b) Incorrect polarity will result in dead short circuit
- (c) The transformers will not share load in proportion to their kVA ratings
- (d) none of the above

Answer: b

- 972. If the percentage impedances of the two transformers working in parallel are different, then**
- (a) transformers will be overheated
 - (b) power factors of both the transformers will be same
 - (c) parallel operation will be not possible
 - (d) parallel operation will still be possible, but the power factors at which the two transformers operate will be different from the power factor of the common load

Answer: d

- 973. In a transformer the tappings are generally provided on**
- (a) primary side
 - (b) secondary side
 - (c) low voltage side
 - (d) high voltage side

Answer: c

- 974. The use of higher flux density in the transformer design**
- (a) reduces weight per kVA
 - (b) reduces iron losses
 - (c) reduces copper losses
 - (d) increases part load efficiency

Answer: a

- 975. The chemical used in breather for transformer should have the quality of**
- (a) ionizing air
 - (b) absorbing moisture
 - (c) cleansing the transformer oil
 - (d) cooling the transformer oil.

Answer: b

- 976. The chemical used in breather is**
- (a) asbestos fiber
 - (b) silica sand
 - (c) sodium chloride
 - (d) silica gel

Answer: d

- 977. An ideal transformer has infinite values of primary and secondary inductances. The statement is**
- (a) true
 - (b) false

Answer: b

978. The transformer ratings are usually expressed in terms of

- (a) volts
- (b) amperes
- (c) kW
- (d) kVA

Answer: d

979. The noise resulting from vibrations of laminations set by magnetic forces, is termed as

- (a) magnetostriction
- (b) boo
- (c) hum
- (d) zoom

Answer: c

980. Hysteresis loss in a transformer varies as B_{max} = maximum flux density)

- (a) B_{max}
- (b) B_{max}^{1-6}
- (C) B_{max}^{1-83}
- (d) B_{max}

Answer: b

981. Material used for construction of transformer core is usually

- (a) wood
- (b) copper
- (c) aluminium
- (d) silicon steel

Answer: d

982. The thickness of laminations used in a transformer is usually

- (a) 0.4 mm to 0.5 mm
- (b) 4 mm to 5 mm
- (c) 14 mm to 15 mm
- (d) 25 mm to 40 mm

Answer: a

983. The function of conservator in a transformer is

- (a) to protect against internal fault
- (b) to reduce copper as well as core losses
- (c) to cool the transformer oil
- (d) to take care of the expansion and contraction of transformer oil due to variation of temperature of surroundings

Answer: d

984. The highest voltage for transmitting electrical power in India is

- (a) 33 kV.
- (b) 66 kV
- (c) 132 kV
- (d) 400 kV

Answer: d

985. In a transformer the resistance between its primary and secondary is

- (a) zero
- (b) 1 ohm
- (c) 1000 ohms
- (d) infinite

Answer: d

986. A transformer oil must be free from

- (a) sludge
- (b) odour
- (c) gases
- (d) moisture

Answer: d

987. A Buchholz relay can be installed on

- (a) auto-transformers
- (b) air-cooled transformers
- (c) welding transformers
- (d) oil cooled transformers

Answer: d

988. Gas is usually not liberated due to dissociation of transformer oil unless the oil temperature exceeds

- (a) 50°C
- (b) 80°C
- (c) 100°C
- (d) 150°C

Answer: d

989. The main reason for generation of harmonics in a transformer could be

- (a) fluctuating load
- (b) poor insulation
- (c) mechanical vibrations
- (d) saturation of core

Answer: d

- 990. Distribution transformers are generally designed for maximum efficiency around**
- (a) 90% load
 - (b) zero load
 - (c) 25% load
 - (d) 50% load

Answer: d

- 991. Which of the following property is not necessarily desirable in the material for transformer core ?**
- (a) Mechanical strength
 - (b) Low hysteresis loss
 - (c) High thermal conductivity
 - (d) High permeability

Answer: c

- 992. Star/star transformers work satisfactorily when**
- (a) load is unbalanced only
 - (b) load is balanced only
 - (c) on balanced as well as unbalanced loads
 - (d) none of the above

Answer: b

- 993. Delta/star transformer works satisfactorily when**
- (a) load is balanced only
 - (b) load is unbalanced only
 - (c) on balanced as well as unbalanced loads
 - (d) none of the above

Answer: c

- 994. Buchholz's relay gives warning and protection against**
- (a) electrical fault inside the transformer itself
 - (b) electrical fault outside the transformer in outgoing feeder
 - (c) for both outside and inside faults
 - (d) none of the above

Answer: a

- 995. The magnetising current of a transformer is usually small because it has**
- (a) small air gap
 - (b) large leakage flux
 - (c) laminated silicon steel core
 - (d) fewer rotating parts

Answer: a

996. Which of the following does not change in an ordinary transformer ?

- (a) Frequency
- (b) Voltage
- (c) Current
- (d) Any of the above

Answer: a

997. Which of the following properties is not necessarily desirable for the material for transformer core ?

- (a) Low hysteresis loss
- (b) High permeability
- (c) High thermal conductivity
- (d) Adequate mechanical strength

Answer: c

998. The leakage flux in a transformer depends upon

- (a) load current
- (b) load current and voltage
- (c) load current, voltage and frequency
- (d) load current, voltage, frequency and power factor

Answer: a

999. The path of the magnetic flux in transformer should have

- (a) high reluctance
- (b) low reactance
- (c) high resistance
- (d) low resistance

Answer: b

1000. Noise level test in a transformer is a

- (a) special test
- (b) routine test
- (c) type test
- (d) none of the above

Answer: c

1001. Which of the following is not a routine test on transformers ?

- (a) Core insulation voltage test
- (b) Impedance test
- (c) Radio interference test
- (d) Polarity test

Answer: c

1002. A transformer can have zero voltage regulation at

- (a) leading power factor
- (b) lagging power factor
- (c) unity power factor
- (d) zero power factor

Answer: a

1003. Helical coils can be used on

- (a) low voltage side of high kVA transformers
- (b) high frequency transformers
- (c) high voltage side of small capacity transformers
- (d) high voltage side of high kVA rating transformers

Answer: a

1004. Harmonics in transformer result in

- (a) increased core losses
- (b) increased I^2R losses
- (c) magnetic interference with communication circuits
- (d) all of the above

Answer: d

1005. The core used in high frequency transformer is usually

- (a) copper core
- (b) cast iron core
- (c) air core
- (d) mild steel core

Answer: c

1006. The full-load copper loss of a transformer is 1600 W. At half-load, the copper loss will be

- (a) 6400 W
- (b) 1600 W
- (c) 800 W
- (d) 400 W

Answer: d

1007. The value of flux involved in the e.m.f. equation of a transformer is

- (a) average value
- (b) r.m.s. value
- (c) maximum value
- (d) instantaneous value

Answer: c

1008. Silicon steel used in laminations mainly reduces

- (a) hysteresis loss
- (b) eddy current losses
- (c) copper losses
- (d) all of the above

Answer: a

1009. Which winding of the transformer has less cross-sectional area ?

- (a) Primary winding
- (b) Secondary winding
- (c) Low voltage winding
- (d) High voltage winding

Answer: d

1010. Power transformers are generally designed to have maximum efficiency around

- (a) no-load
- (b) half-load
- (c) near full-load
- (d) 10% overload

Answer: c

1011. Which of the following is the main advantage of an auto-transformer over a two winding transformer ?

- (a) Hysteresis losses are reduced
- (b) Saving in winding material
- (c) Copper losses are negligible
- (d) Eddy losses are totally eliminated

Answer: b

1012. During short circuit test iron losses are negligible because

- (a) the current on secondary side is negligible
- (b) the voltage on secondary side does not vary
- (c) the voltage applied on primary side is low
- (d) full-load current is not supplied to the transformer

Answer: c

1013. Two transformers are connected in parallel. These transformers do not have equal percentage impedance. This is likely to result in

- (a) short-circuiting of the secondaries
- (b) power factor of one of the transformers is leading while that of the other lagging
- (c) transformers having higher copper losses will have negligible core losses
- (d) loading of the transformers not in proportion to their kVA ratings

Answer: d

1014. The changes in volume of transformer cooling oil due to variation of atmospheric temperature during day and night is taken care of by which part of transformer

- (a) Conservator
- (b) Breather
- (c) Bushings
- (d) Buchholz relay

Answer: a

1015. An ideal transformer is one which has

- (a) no losses and magnetic leakage
- (b) interleaved primary and secondary windings
- (c) a common core for its primary and secondary windings
- (d) core of stainless steel and winding of pure copper metal

Answer: a

1016. When a given transformer is run at its rated voltage but reduced frequency, its

- (a) flux density remains unaffected
- (b) iron losses are reduced
- (c) core flux density is reduced
- (d) core flux density is increased

Answer: d

1017. In an actual transformer the iron loss remains practically constant from no-load to full-load because

- (a) value of transformation ratio remains constant
- (b) permeability of transformer core remains constant
- (c) core flux remains practically constant
- (d) primary voltage remains constant

Answer: c

1018. An ideal transformer will have maximum efficiency at a load such that

- (a) copper loss = iron loss
- (b) copper loss < iron loss
- (c) copper loss > iron loss
- (d) none of the above

Answer: a

1019. If the supply frequency to the transformer is increased, the iron loss will

- (a) not change
- (b) decrease
- (c) increase
- (d) any of the above

Answer: c

1020. Negative voltage regulation is indicative that the load is

- (a) capacitive only
- (b) inductive only
- (c) inductive or resistive
- (d) none of the above

Answer: a

1021. Iron loss of a transformer can be measured by

- (a) low power factor wattmeter
- (b) unity power factor wattmeter
- (c) frequency meter
- (d) any type of wattmeter

Answer: a

1022. When secondary of a current transformer is open-circuited its iron core will be

- (a) hot because of heavy iron losses taking place in it due to high flux density
- (b) hot because primary will carry heavy current
- (c) cool as there is no secondary current
- (d) none of above will happen

Answer: a

1023. The transformer laminations are insulated from each other by

- (a) mica strip
- (b) thin coat of varnish
- (c) paper
- (d) any of the above

Answer: b

1024. Which type of winding is used in 3phase shell-type transformer ?

- (a) Circular type
- (b) Sandwich type
- (c) Cylindrical type
- (d) Rectangular type

Answer: b

1025. During open circuit test of a transformer

- (a) primary is supplied rated voltage
- (b) primary is supplied full-load current
- (c) primary is supplied current at reduced voltage
- (d) primary is supplied rated kVA

Answer: a

1026. Open circuit test on transformers is conducted to determine

- (a) hysteresis losses
- (b) copper losses
- (c) core losses
- (d) eddy current losses

Answer: c

1027. Short circuit test on transformers is conducted to determine

- (a) hysteresis losses
- (b) copper losses
- (c) core losses
- (d) eddy current losses

Answer: b

1028. For the parallel operation of single phase transformers it is necessary that they should have

- (a) same efficiency
- (b) same polarity
- (c) same kVA rating
- (d) same number of turns on the secondary side.

Answer: b

1029. The transformer oil should have _____ volatility and _____ viscosity.

- (a) low, low
- (b) high, high
- (c) low, high
- (d) high, low

Answer: a

1030. The function of breather in a transformer is

- (a) to provide oxygen inside the tank
- (b) to cool the coils during reduced load
- (c) to cool the transformer oil
- (d) to arrest flow of moisture when outside air enters the transformer

Answer: d

1031. The secondary winding of which of the following transformers is always kept closed ?

- (a) Step-up transformer
- (b) Step-down transformer
- (c) Potential transformer
- (d) Current transformer

Answer: d

1032. The size of a transformer core will depend on

- (a) frequency
- (b) area of the core
- (c) flux density of the core material
- (d) (a) and (b) both

Answer: d

1033. Natural air cooling is generally restricted for transformers up to

- (a) 1.5 MVA
- (b) 5 MVA
- (c) 15 MVA
- (d) 50 MVA

Answer: a

1034. A shell-type transformer has

- (a) high eddy current losses
- (b) reduced magnetic leakage
- (c) negligibly hysteresis losses
- (d) none of the above

Answer: b

1035. A transformer can have regulation closer to zero

- (a) on full-load
- (b) on overload
- (c) on leading power factor
- (d) on zero power factor

Answer: c

1036. A transformer transforms

- (a) voltage
- (b) current
- (c) current and voltage
- (d) power

Answer: d

1037. Which of the following is not the standard voltage for power supply in India ?

- (a) 11kV
- (b) 33kV
- (c) 66 kV
- (d) 122 kV

Answer: d

1038. Reduction in core losses and increase in permeability are obtained with transformer employing

- (a) core built-up of laminations of cold rolled grain oriented steel
- (b) core built-up of laminations of hot rolled sheet
- (c) either of the above
- (d) none of the above

Answer: a

1039. In a power or distribution transformer about 10 per cent end turns are heavily insulated

- (a) to withstand the high voltage drop due to line surge produced by the shunting capacitance of the end turns
- (b) to absorb the line surge voltage and save the winding of transformer from damage
- (c) to reflect the line surge and save the winding of a transformer from damage
- (d) none of the above

Answer: a

1040. For given applied voltage, with the increase in frequency of the applied voltage

- (a) eddy current loss will decrease
- (b) eddy current loss will increase
- (c) eddy current loss will remain unchanged
- (d) none of the above

Answer: c

1041. Losses which occur in rotating electric machines and do not occur in transformers are

- (a) friction and windage losses
- (b) magnetic losses
- (c) hysteresis and eddy current losses
- (d) copper losses

Answer: a

1042. In a given transformer for a given applied voltage, losses which remain constant irrespective of load changes are

- (a) hysteresis and eddy current losses
- (b) friction and windage losses
- (c) copper losses
- (d) none of the above

Answer: a

1043. Which of the following statements regarding an ideal single-phase transformer having a turn ratio of 1 : 2 and drawing a current of 10 A from 200 V A.C. supply is incorrect ?

- (a) Its secondary current is 5 A
- (b) Its secondary voltage is 400 V
- (c) Its rating is 2 kVA
- (d) Its secondary current is 20 A
- (e) It is a step-up transformer

Answer: d

1044. The secondary of a current transformer is always short-circuited under operating conditions because it

- (a) avoids core saturation and high voltage induction
- (b) is safe to human beings
- (c) protects the primary circuit
- (d) none of the above

Answer: a

1045. In a transformer the resistance between its primary and secondary should be

- (a) zero
- (b) 10 Ω
- (c) 1000 Ω
- (d) infinity

Answer: d

1046. A good voltage regulation of a transformer means

- (a) output voltage fluctuation from no load to full load is least
- (b) output voltage fluctuation with power factor is least
- (c) difference between primary and secondary voltage is least
- (d) difference between primary and secondary voltage is maximum

Answer: a

1047. For a transformer, operating at constant load current, maximum efficiency will occur at

- (a) 0.8 leading power factor
- (b) 0.8 lagging power factor
- (c) zero power factor
- (d) unity power factor

Answer: d

1048. Which of the following protection is normally not provided on small distribution transformers ?

- (a) Overfluxing protection
- (b) Buchholz relay
- (c) Overcurrent protection
- (d) All of the above

Answer: b

1049. Which of the following acts as a protection against high voltage surges due to lightning and switching ?

- (a) Horn gaps
- (b) Thermal overload relays
- (c) Breather
- (d) Conservator

Answer: a

1050. The efficiency of two identical transformers under load conditions can be determined by

- (a) short-circuit test
- (b) back-to-back test
- (c) open circuit test
- (d) any of the above

Answer: b

1051. Which of the following insulating materials can withstand the highest temperature safely ?

- (a) Cellulose
- (b) Asbestos
- (c) Mica
- (d) Glass fibre

Answer: c

1052. Which of the following parts of a transformer is visible from outside ?

- (a) Bushings
- (b) Core
- (c) Primary winding
- (d) Secondary winding

Answer: a

1053. The noise produced by a transformer is termed as

- (a) zoom
- (b) hum
- (c) ringing
- (d) buzz

Answer: b

1054. Which of the following loss in a transformer is zero even at full load ?

- (a) Core loss
- (b) Friction loss
- (c) Eddy current loss
- (d) Hysteresis loss

Answer: b

1055. Which of the following is the most likely source of harmonics in a transformer ?

- (a) poor insulation
- (b) Overload
- (c) loose connections
- (d) Core saturation

Answer: d

1056. If a transformer is continuously operated the maximum temperature rise will occur in

- (a) core
- (b) windings
- (c) tank
- (d) any of the above

Answer: b

1057. The hum in a transformer is mainly attributed to

- (a) load changes
- (b) oil in the transformer
- (c) magnetostriction
- (d) mechanical vibrations

Answer: c

1058. The maximum load that a power transformer can carry is limited by its

- (a) temperature rise
- (b) dielectric strength of oil
- (c) voltage ratio
- (d) copper loss

Answer: c

1059. The efficiency of a transformer, under heavy loads, is comparatively low because

- (a) copper loss becomes high in proportion to the output
- (b) iron loss is increased considerably
- (c) voltage drop both in primary and secondary becomes large
- (d) secondary output is much less as compared to primary input

Answer: a

1060. An open-circuit test on a transformer is conducted primarily to measure

- (a) insulation resistance
- (b) copper loss
- (c) core loss
- (d) total loss
- (e) efficiency
- (f) none of the above

Answer: c

1061. A no-load test is performed on a transformer to determine

- (a) core loss
- (b) copper loss
- (c) efficiency
- (d) magnetising current
- (e) magnetising current and loss

Ans: e

1062. The voltage transformation ratio of a transformer is equal to the ratio of

- (a) primary turns to secondary turns
- (b) secondary current to primary current
- (c) secondary induced e.m.f. to primary induced e.m.f.
- (d) secondary terminal voltage to primary applied voltage

Answer: c

1063. Part of the transformer which is most subject to damage from overheating is

- (a) iron core
- (b) copper winding
- (c) winding insulation
- (d) frame or case
- (e) transformer tank

Answer: c

1064. If a transformer is switched on to a voltage more than the rated voltage

- (a) its power factor will deteriorate
- (b) its power factor will increase
- (c) its power factor will remain unaffected
- (d) its power factor will be zero

Answer: a

1065. Auto-transformer makes effective saving on copper and copper losses, when its transformation ratio is

- (a) approximately equal to one
- (b) less than one
- (c) great than one
- (d) none of the above

Answer: a

1066. Minimum voltage regulation occurs when the power factor of the load is

- (a) unity
- (b) lagging
- (c) leading
- (d) zero

Answer: c

1067. In a step-down transformer, there is a change of 15 A in the load current. This results in change of supply current of

- (a) less than 15 A
- (b) more than 15 A
- (c) 15 A
- (d) none of the above

Answer: a

1068. The efficiencies of transformers compared with that of electric motors of the same power are

- (a) about the same
- (b) much smaller
- (c) much higher
- (d) somewhat smaller
- (e) none of the above

Answer: c

1069. The main function of a fuse is to

- (a) protect the line
- (b) open the circuit
- (c) protect the appliance
- (d) prevent excessive currents

Ans: d

1070. On which of the following routine tests are conducted ?

- (a) Oil circuit breakers
- (b) Air blast circuit breakers
- (c) Minimum oil circuit breakers
- (d) All of the above

Ans: d

1071. SF6 gas

- (a) is yellow in colour
- (b) is lighter than air
- (c) is nontoxic
- (d) has pungent smell

Ans: c

1072. The arcing contacts in a circuit breaker are made of

- (a) copper tungsten alloy
- (b) porcelain
- (c) electrolytic copper
- (d) aluminium alloy

Ans: a

1073. Which of the following medium is employed for extinction of arc in air circuit breaker ?

- (a) Water
- (b) Oil
- (c) Air
- (d) SF6

Ans: c

1074. With which of the following, a circuit breaker must be equipped for remote operation ?

- (a) Inverse time trip
- (b) Time-delay trip
- (c) Shunt trip
- (d) None of the above

Ans: c

1075. Fault diverters are basically

- (a) fuses
- (b) relays
- (c) fast switches
- (d) circuit breakers

Ans: c

1076. A thermal protection switch can protect against

- (a) short-circuit
- (b) temperature
- (c) overload
- (d) over voltage

Ans: c

1077. Arc in a circuit behaves as

- (a) a capacitive reactance
- (b) an inductive reactance
- (c) a resistance increasing with voltage rise across the arc
- (d) a resistance decreasing with voltage rise across the arc

Ans: d

1078. Thermal circuit breaker has

- (a) delayed trip action
- (b) instantaneous trip action
- (c) both of the above
- (d) none of the above

Ans: a

1079. Relays can be designed to respond to changes in

- (a) resistance, reactance or impedance
- (b) voltage and current
- (c) temperature
- (d) all above

Ans: d

1080. Overload relays are of..... type.

- (a) induction
- (b) thermal
- (c) electromagnetic
- (d) all above

Ans: d

1081. Thermal overload relays are used to protect the motor against over current due to

- (a) short-circuits
- (b) heavy loads
- (c) grounds
- (d) all of the above

Ans: b

1082. Magnetic circuit breaker has _____ trip action.

- (a) delayed
- (b) instantaneous
- (c) both of the above
- (d) none of the above

Ans: b

- 1083. D.C. shunt relays are made of**
- (a) few turns of thin wire
 - (b) few turns of thick wire
 - (c) many turns of thin wire
 - (d) many turns of thick wire

Ans: c

- 1084. The relay operating speed depends upon**
- (a) the spring tension
 - (b) the rate of flux built up
 - (c) armature core air gap
 - (d) all of the above

Ans: d

- 1085. In order that current should flow without causing excessive heating or voltage drop, the relay contacts should**
- (a) have low contact resistance
 - (b) be clean and smooth
 - (c) be of sufficient size and proper shape
 - (d) have all above properties

Ans: d

- 1086. Circuit breakers usually operate under**
- (a) transient state of short-circuit current
 - (b) sub-transient state of short-circuit current
 - (c) steady state of short-circuit current
 - (d) after D.C. component has ceased

Ans: a

- 1087. Circuit breakers are essentially**
- (a) current carrying contacts called electrodes
 - (b) arc extinguishers
 - (c) circuits to break the system
 - (d) transformers to isolate the two systems

Ans: a

- 1088. The current zero interruption, in oil and air blast circuit breakers, is achieved by**
- (a) lengthening of the gap
 - (b) cooling and blast effect
 - (c) both (a) and (b)
 - (d) deionizing the oil with forced air

Ans: c

1089. Air blast circuit breaker is used for

- (a) over currents
- (b) short duty
- (c) intermittent duty
- (d) repeated duty

Ans: d

1090. An efficient and a well designed protective relaying should have

- (a) good selectivity and reliability
- (b) economy and simplicity
- (c) high speed and selectivity
- (d) all of the above

Ans: d

1091. Burden of a protective relay is the power

- (a) required to operate the circuit breaker
- (b) absorbed by the circuit of relay
- (c) developed by the relay circuit
- (d) none of the above

Ans: b

1092. Directional relays are based on flow of

- (a) power
- (b) current
- (c) voltage wave
- (d) all of the above

Ans:

1093. A differential relay measures the vector difference between

- (a) two currents
- (b) two voltages
- (c) two or more similar electrical quantities
- (d) none of the above

Ans: c

1094. A transmission line is protected by

- (a) inrush protection
- (b) distance protection
- (c) time graded and current graded over current protection
- (d) both (b) and (c)

Ans: d

1095. Large internal faults are protected by

- (a) merz price percentage differential protection
- (b) mho and ohm relays
- (c) horn gaps and temperature relays
- (d) earth fault and positive sequence relays

Ans: a

1096. When a transmission line is energized, the wave that propagates on it is

- (a) current wave only
- (b) voltage wave only
- (c) both (a) and (b)
- (d) power factor wave only

Ans: c

1097. Protective relays are devices that detect abnormal conditions in electrical circuits by measuring

- (a) current during abnormal condition
- (b) voltage during abnormal condition
- (c) constantly the electrical quantities which differ during normal and abnormal conditions
- (d) none of the above

Ans: c

1098. The voltage appearing across the contacts after opening of the circuit breaker is called _____ voltage.

- (a) recovery
- (b) surge
- (c) operating
- (d) arc

Ans: a

1099. Ionization in circuit breaker is facilitated by

- (a) high temperature
- (b) increase of mean free path
- (c) increasing field strength
- (d) all of the above

Ans: d

1100. In a circuit breaker the basic problem is to

- (a) maintain the arc
- (b) extinguish the arc
- (c) transmit large power
- (d) emit the ionizing electrons

Ans: c

1101. Overheating of relay contacts or contact born out is due to

- (a) slow making and breaking of load circuit contacts
- (b) foreign matter on the contact surface
- (c) too low contact pressure
- (d) all of the above

Ans: d

1102. Interruption of large currents by relay requires

- (a) arc suppressing blow out coils
- (b) wide separation of the opened contacts
- (c) high speed opening of contacts
- (d) all of the above

Ans: d

1103. Shunt capacitance is neglected while considering

- (a) short transmission line
- (b) medium transmission line
- (c) long transmission line
- (d) medium and long transmission lines

Ans: a

1104. The arc voltage produced in A.C. circuit breaker is always

- (a) in phase with the arc current
- (b) lagging the arc current by 90°
- (c) leading the arc current by 90°
- (d) none of the above

Ans: a

1105. The time of closing the cycle, in modern circuit breakers is

- (a) 0.003 sec
- (b) 0.001 sec
- (c) 0.01 sec
- (d) 0.10 sec

Ans: a

1106. Insulation resistance of high voltage circuit breakers is more than

- (a) 1 mega ohms
- (b) 10 mega ohms
- (c) 100 mega ohms
- (d) 500 mega ohms

Ans: c

1107. H.R.C. fuses provide best protection against

- (a) overload
- (b) reverse current
- (c) open-circuits
- (d) short-circuits

Ans: d

1108. The ground wire should not be smaller than No _____ copper.

- (a) 2
- (b) 4
- (c) 6
- (d) 10

Ans: d

1109. The delay fuses are used for the protection of _____ .

- (a) motors
- (b) power outlet circuits
- (c) fluorescent lamps
- (d) light circuits

Ans: a

1110. Which of the following is the least expensive protection for overcurrent is low voltage system ?

- (a) Rewireable fuse
- (b) Isolator
- (c) Oil circuit breaker
- (d) Air break circuit breaker

Ans: a

1111. Resistance grounding is used for voltage between

- (a) 33kV to 66kV
- (b) HkV to 33kV
- (c) 3.3kV and 11kV
- (d) none of the above

Ans: c

1112. The contacts of high voltage switches used in power system are submerged in oil. The main purpose of the oil is to

- (a) lubricate the contacts
- (b) insulate the contacts from switch body
- (c) extinguish the arc
- (d) all of the above

Ans: c

1113. To protect most of the electrical equipment handling low power, the types of relays used are

- (a) thermocouple
- (b) electronic and bimetallic
- (c) both (a) and (b)
- (d) none of the above

Ans: c

1114. Wave trap is used to trap waves of

- (a) power frequencies
- (b) higher frequencies entering generator or transformer units
- (c) either of the above
- (d) none of the above

Ans: b

1115. Ungrounded neutral transmission system is not recommended because of system

- (a) insulation being overstressed due to over voltages
- (b) insulation overstress may lead to failure and subsequent phase to phase faults
- (c) being inadequately protected against ground fault
- (d) all of the above

Ans: d

1116. The reflection co-efficient at the open circuited end of a transmission line.

- (a) zero
- (b) infinity
- (c) unity
- (d) none of the above

Ans: c

1117. For the protection of power station buildings against direct strokes the requirements are

- (a) interception
- (b) interception and conduction
- (c) interception, conduction and dissipation
- (d) interception, conduction, dissipation and reflection

Ans: c

1118. The line insulation is the insulation level of the station equipment.

- (a) less than
- (b) more than
- (c) proportional to
- (d) not directly related with

Ans: d

1119. The interaction between a transmission line and communication line is minimized by

- (a) transposing transmission as well as communication lines
- (b) increasing the height of the transmission line tower
- (c) increasing the distance between the two lines
- (d) all of the above

Ans: d

1120. When a wave propagates on a transmission line, it suffers reflection several times at

- (a) tapping
- (b) load end
- (c) sending end
- (d) sending and other end

Ans: d

1121. Which of the following statements is incorrect?

- (a) Station batteries are used to operate relay only
- (b) The lightning arresters are basically surge diverters
- (c) An impedance relay has maximum fault current when fault occurs near the relay
- (d) A high speed relay has an operation of 1 to 2 cycles

Ans: a

1122. Discrimination between main and back up protection is provided by the use of relays which are

- (a) fast
- (b) sensitive
- (c) slow
- (d) none of the above

Ans: c

1123. Induction cup relay is operated due to changes in

- (a) current
- (b) voltage
- (c) impedance
- (d) all of the above

Ans: d

1124. A.C. network analyser is used to solve problems of

- (a) load flow
- (b) load flow and short-circuit
- (c) load flow and stability
- (d) load flow, short-circuit and stability

Ans: d

1125. Which of the following statements is incorrect ?

- (a) Lightning arrestors are used before the switchgear
- (b) Shunt reactors are used as compensation reactors
- (c) The peak short current is $(1.8 \times V^2)$ times the A.C. component
- (d) The MVA at fault is equal to base MVA divided by per unit equivalent fault reactance

reactance

Ans: a

1126. Short-circuit currents are due to

- (a) single phase to ground faults
- (b) phase to phase faults
- (c) two phase to ground faults
- (d) any of these

Ans: d

1127. To reduce short circuit fault currents are used.

- (a) reactors
- (b) resistors
- (c) capacitors
- (d) none of the above

Ans: a

1128. Bus coupler is very essential in arrangement

- (a) single bus
- (b) double bus, double breaker
- (c) main and transfer bus
- (d) all of the above

Ans: c

1129. For cost and safety, the outdoor substations are installed for voltages above

- (a) 11 kV
- (b) 33 kV
- (c) 60kV
- (d) 110kV

Ans: b

1130. The short circuit in any winding of the transformer is the result of

- (a) mechanical vibration
- (b) insulation failure
- (c) loose connection
- (d) impulse voltage

Ans: d

1131. relays are used for phase faults on long line.

- (a) Impedance
- (b) Reactance
- (c) Either of the above
- (d) None of the above

Ans: a

1132. For which of the following protection from negative sequence currents is provided ?

- (a) Generators
- (b) Motors
- (c) Transmission line
- (d) Transformers

Ans: a

1133. relay is preferred for phase fault on short transmission line.

- (a) Induction type
- (b) Reactance
- (c) Impedance
- (d) None of the above

Ans: b

1134. Distance relays are generally

- (a) split-phase relays
- (b) reactance relays
- (c) impedance relays
- (d) none of the above

Ans: d

1135. For which of the following ratings of the transformer differential protection is recommended ?

- (a) above 30 kVA.
- (b) equal to and above 5 MVA
- (c) equal to and above 25 MVA
- (d) none of the above

Ans: b

1136. A _____ is used to measure the stator % winding temperature of the generator.

- (a) thermocouple
- (b) pyrometer
- (c) resistance thermometer
- (d) thermometer

Ans: c

1137. The under voltage relay can be used for

- (a) generators
- (b) busbars
- (c) transformers
- (d) all of the above

Ans: d

1138. The relay with inverse time characteristic will operate within

- (a) 1.5 sec
- (b) 5 to 10 sec
- (c) 5 to 20 sec
- (d) 20 to 30 sec

Ans: b

1139. The single phasing relays are used for the protection of

- (a) single phase motors only
- (b) two phase motors only
- (c) two single phase motors running in parallel
- (d) three phase motors

Ans: d

1140. Which of the following devices will receive voltage surge first travelling on the transmission line ?

- (a) Lightning arresters
- (b) Relays
- (c) Step-down transformer
- (d) Switchgear

Ans: a

1141. Which of the following parameter can be neglected for a short line ?

- (a) Inductance
- (b) Capacitance
- (c) Resistance
- (d) Reactance

Ans: b

1142. Series reactors should have

- (a) low resistance
- (b) high resistance
- (c) low impedance
- (d) high impedance

Ans: a

1143. Which of the following circuit breakers has high reliability and minimum maintenance ?

- (a) Air blast circuit breakers
- (b) Circuit breaker with SF6 gas
- (c) Vacuum circuit breakers
- (d) Oil circuit breakers

Ans: b

1144. Arc in a circuit breaker is interrupted at

- (a) zero current
- (b) maximum current
- (c) minimum voltage
- (d) maximum voltage

Ans: a

1145. transmission line has reflection coefficient as one.

- (a) Open circuit
- (b) Short-circuit
- (c) Long
- (d) None of the above

Ans: a

1146. What will be the reflection co-efficient of the wave of load connected to transmission line if surge impedance of the line is equal to load ?

- (a) Zero
- (b) Unity
- (c) Infinity
- (d) None of the above

Ans: a

1147. The inverse definite mean time relays are used for over current and earth fault protection of transformer against

- (a) heavy loads
- (b) internal short-circuits
- (c) external short-circuits
- (d) all of the above

Ans: b

1148. Over voltage protection is recommended for

- (a) hydro-electric generators
- (b) steam turbine generators
- (c) gas turbine generators
- (d) all of the above

Ans: d

1149. Air blast circuit breakers for 400 kV power system are designed to operate in

- (a) 100 microsecond
- (b) 50 millisecond
- (c) 0.5 sec
- (d) 0.1 sec

Ans: b

1150. Overfluxing protection is recommended for

- (a) distribution transformer
- (b) generator transformer of the power plant
- (c) auto-transformer of the power plant
- (d) station transformer of the power plant

Ans: b

1151. Series capacitors are used to

- (a) compensate for line inductive reactance
- (b) compensate for line capacitive reactance
- (c) improve line voltage
- (d) none of the above

Ans: a

1152. Admittance relay is _____ relay.

- (a) impedance
- (b) directional
- (c) non-directional
- (d) none of the above

Ans: b

1153. The material used for fuse must have

- (a) low melting point and high specific resistance
- (b) low melting point and -low specific resistance
- (c) high melting point and low specific resistance
- (d) low melting point and any specific resistance

Ans: a

1154. If the fault occurs near the impedance relay, the VII ratio will be

- (a) constant for all distances
- (b) lower than that of if fault occurs away from the relay
- (c) higher than that of if fault occurs away from the relay
- (d) none of the above

Ans: b

1155. The torque produced in induction type relay (shaded pole structure) is

- (a) inversely proportional to the current
- (b) inversely proportional to the square of the current
- (c) proportional to the current
- (d) proportional to square of the current

Ans: b

1156. The steady state stability of the power system can be increased by

- (a) connecting lines in parallel
- (b) connecting lines in series
- (c) using machines of high impedance
- (d) reducing the excitation of machines

Ans: a

1157. The inductive interference between power and communication line can be minimized by

- (a) transposition of the power line
- (b) transposition of the communication line
- (c) both (a) and (b)
- (d) increasing the distance between the conductors

Ans: c

1158. The power loss is an important factor for the design of

- (a) transmission line
- (b) motor
- (c) generator
- (d) feeder

Ans: a

1159. A fuse is connected

- (a) in series with circuit
- (b) in parallel with circuit
- (c) either in series or in parallel with circuit
- (d) none of the above

Ans: a

1160. H.R.C. fuse, as compared to a rewirable fuse, has

- (a) no ageing effect
- (b) high speed of operation
- (c) high rupturing capacity
- (d) all of the above

Ans: d

1161. The fuse rating is expressed in terms of

- (a) current
- (b) voltage
- (c) VAR
- (d) kVA

Ans: a

1162. The fuse blows off by

- (a) burning
- (b) arcing
- (c) melting
- (d) none of the above

Ans: c

1163. On which of the following effects of electric current a fuse operates ?

- (a) Photoelectric effect
- (b) Electrostatic effect
- (c) Heating effect
- (d) Magnetic effect

Ans: c

1164. An isolator is installed

- (a) to operate the relay of circuit breaker
- (b) as a substitute for circuit breaker
- (c) always independent of the position of circuit breaker
- (d) generally on both sides of a circuit breaker

Ans: d

1165. A fuse in a motor circuit provides protection against

- (a) overload
- (b) short-circuit and overload
- (c) open circuit, short-circuit and overload
- (d) none of the above

Ans: b

1166. Protection by fuses is generally not used beyond

- (a) 20 A
- (b) 50 A
- (c) 100 A
- (d) 200 A

Ans: c

1167. A fuse is never inserted in

- (a) neutral wire
- (b) negative of D.C. circuit
- (c) positive of D.C. circuit
- (d) phase line

Ans: a

1168. Oil switches are employed for

- (a) low currents circuits
- (b) low voltages circuits
- (c) high voltages and large currents circuits
- (d) all circuits

Ans: c

1169. A switchgear is device used for

- (a) interrupting an electrical circuit
- (b) switching an electrical circuit
- (c) switching and controlling an electrical circuit
- (d) switching, controlling and protecting the electrical circuit and equipment

Ans: d

1170. The fuse wire, in D.C. circuits, is inserted in

- (a) negative circuit only
- (b) positive circuit only
- (c) both (a) and (b)
- (d) either (a) or (b)

Ans: c

1171. By which of the following methods major portion of the heat generated in a H.R.C. fuse is dissipated ?

- (a) Radiation
- (b) Convection
- (c) Conduction
- (d) All of the above

Ans: c

1172. A short-circuit is identified by

- (a) no current flow
- (b) heavy current flow
- (c) voltage drop
- (d) voltage rise

Ans: b

1173. The information to the circuit breaker under fault conditions is provided by

- (a) relay
- (b) rewirable fuse
- (c) H.R.C. only
- (d) all of the above

Ans: a

1174. To limit short-circuit current in a power system are used.

- (a) earth wires
- (b) isolators
- (c) H.R.C. fuses
- (d) reactors

Ans: d

1175. A balanced 3-phase system consists of

- (a) zero sequence currents only
- (b) positive sequence currents only
- (c) negative and zero sequence currents
- (d) zero, negative and positive sequence currents

Ans: b

1176. In a single bus-bar system there will be complete shut down when

- (a) fault occurs on the bus itself
- (b) fault occurs on neutral line
- (c) two or more faults occur simultaneously
- (d) fault occurs with respect to earthing

Ans: a

1177. The use of _____ instrument is merely confined within laboratories as standardizing instruments.

- (a) absolute
- (b) indicating
- (c) recording
- (d) integrating

Ans: a

1178. Which of the following instruments indicate the instantaneous value of the electrical quantity being measured at the time at which it is being measured?

- (a) Absolute instruments
- (b) Indicating instruments
- (c) Recording instruments
- (d) Integrating instruments

Ans: b

1179. _____ instruments are those which measure the total quantity of electricity delivered in a particular time.

- (a) Absolute
- (b) Indicating
- (c) Recording
- (d) Integrating

Ans: d

1180. Which of the following are integrating instruments?

- (a) Ammeters
- (b) Voltmeters
- (c) Wattmeters
- (d) Ampere-hour and watt-hour meters

Ans: d

1181. Resistances can be measured with the help of

- (a) wattmeters
- (b) voltmeters
- (c) ammeters
- (d) ohmmeters and resistance bridges
- (e) all of the above

Ans: d

1182. According to application, instruments are classified as

- (a) switch board
- (b) portable
- (c) both (a) and (b)
- (d) moving coil
- (e) moving iron
- (f) both (d) and (e)

Ans: c

1183. Which of the following essential features is possessed by an indicating instrument?

- (a) Deflecting device
- (b) Controlling device
- (c) Damping device
- (d) All of the above

Ans: d

1184. A _____ device prevents the oscillation of the moving system and enables the latter to reach its final position quickly
(a) deflecting
(b) controlling
(c) damping
(d) any of the above
Ans: c

1185. The spring material used in a spring control device should have the following property.
(a) Should be non-magnetic
(b) Must be of low temperature co-efficient
(c) Should have low specific resistance
(d) Should not be subjected to fatigue
(e) All of the above
Ans: e

1186. Which of the following properties a damping oil must possess?
(a) Must be a good insulator
(b) Should be non-evaporating
(c) Should not have corrosive action upon the metal of the vane
(d) The viscosity of the oil should not change with the temperature
(e) All of the above
Ans: e

1187. A moving-coil permanent-magnet instrument can be used as _____ by using a low resistance shunt.
(a) ammeter
(b) voltmeter
(c) flux-meter
(d) ballistic galvanometer
Ans: a

1188. A moving-coil permanent-magnet instrument can be used as flux-meter
(a) by using a low resistance shunt
(b) by using a high series resistance
(c) by eliminating the control springs
(d) by making control springs of large moment of inertia
Ans: c

1189. Which of the following devices may be used for extending the range of instruments?

- (a) Shunts
- (b) Multipliers
- (c) Current transformers
- (d) Potential transformers
- (e) All of the above

Ans: e

1190. An induction meter can handle current upto

- (a) 10 A
- (b) 30 A
- (c) 60 A
- (d) 100 A

Ans: d

1191. For handling greater currents induction wattmeters are used in conjunction with

- (a) potential transformers
- (b) current transformers
- (c) power transformers
- (d) either of the above
- (e) none of the above

Ans: b

1192. Induction type single phase energy meters measure electric energy in

- (a) kW
- (b) Wh
- (c) kWh
- (d) VAR
- (e) None of the above

Ans: c

1193. Most common form of A.C. meters met with in every day domestic and industrial installations are

- (a) mercury motor meters
- (b) commutator motor meters
- (c) induction type single phase energy meters
- (d) all of the above

Ans: c

1194. Which of the following meters are not used on D.C. circuits

- (a) Mercury motor meters
- (b) Commutator motor meters
- (c) Induction meters
- (d) None of the above

Ans: c

1195. Which of the following is an essential part of a motor meter?

- (a) An operating torque system
- (b) A braking device
- (c) Revolution registering device
- (d) All of the above

Ans: d

1196. A potentiometer may be used for

- (a) measurement of resistance
- (b) measurement of current
- (c) calibration of ammeter
- (d) calibration of voltmeter
- (e) all of the above

Ans: e

1197. is an instrument which measures the insulation resistance of an electric circuit relative to earth and one another,

- (a) Tangent galvanometer
- (b) Meggar
- (c) Current transformer
- (d) None of the above

Ans: b

1198. The household energy meter is

- (a) an indicating instrument
- (b) a recording instrument
- (c) an integrating instrument
- (d) none of the above

Ans: c

1199. The pointer of an indicating instrument should be

- (a) very light
- (b) very heavy
- (c) either (a) or (b)
- (d) neither (a) nor (b)

Ans: a

1200. The chemical effect of current is used in

- (a) D.C. ammeter hour meter
- (b) D.C. ammeter
- (c) D.C. energy meter
- (d) none of the above

Ans: a

1201. In majority of instruments damping is provided by

- (a) fluid friction
- (b) spring
- (c) eddy currents
- (d) all of the above

Ans: c

1202. An ammeter is a

- (a) secondary instrument
- (b) absolute instrument
- (c) recording instrument
- (d) integrating instrument

Ans: a

1203. In a portable instrument, the controlling torque is provided by

- (a) spring
- (b) gravity
- (c) eddy currents
- (d) all of the above

Ans: a

1204. The disc of an instrument using eddy current damping should be of

- (a) conducting and magnetic material
- (b) non-conducting and magnetic material
- (c) conducting and non-magnetic material
- (d) none of the above

Ans: c

1205. The switch board instruments

- (a) should be mounted in vertical position
- (b) should be mounted in horizontal position
- (c) either (a) or (b)
- (d) neither (a) nor (b)

Ans: a

1206. The function of shunt in an ammeter is to

- (a) by pass the current
- (b) increase the sensitivity of the ammeter
- (c) increase the resistance of ammeter
- (d) none of the above

Ans: a

1207. The multiplier and the meter coil in a voltmeter are in

- (a) series
- (b) parallel
- (c) series-parallel
- (d) none of the above

Ans: a

1208. A moving iron instrument can be used for

- (a) D.C. only
- (b) A.C. only
- (c) both D.C. and A.C.

Ans: c

1209. The scale of a rectifier instrument is

- (a) linear
- (b) non-linear
- (c) either (a) or (b)
- (d) neither (a) nor (b)

Ans: a

1210. For measuring current at high frequency we should use

- (a) moving iron instrument
- (b) electrostatic instrument
- (c) thermocouple instrument
- (d) none of the above

Ans: c

1211. The resistance in the circuit of the moving coil of a dynamometer wattmeter should be

- (a) almost zero
- (b) low
- (c) high
- (d) none of the above

Ans: c

1212. A dynamometer wattmeter can be used for

- (a) both D.C. and A.C.
- (b) D.C. only
- (c) A.C. only
- (d) any of the above

Ans: a

1213. An induction wattmeter can be used for

- (a) both D.C. and A.C.
- (b) D.C. only
- (c) A.C. only
- (d) any of the above

Ans: b

1214. The pressure coil of a wattmeter should be connected on the supply side of the current coil when

- (a) load impedance is high
- (b) load impedance is low
- (c) supply voltage is low
- (d) none of the above

Ans: a

1215. In a low power factor wattmeter the pressure coil is connected

- (a) to the supply side of the current coil
- (b) to the load side of the current coil
- (c) in any of the two meters at connection
- (d) none of the above

Ans: b

1216. In a low power factor wattmeter the compensating coil is connected

- (a) in series with current coil
- (b) in parallel with current coil
- (c) in series with pressure coil
- (d) in parallel with pressure coil

Ans: c

1217. In a 3-phase power measurement by two wattmeter method, both the watt meters had identical readings. The power factor of the load was

- (a) unity
- (b) 0.8 lagging
- (c) 0.8 leading
- (d) zero

Ans: a

1218. In a 3-phase power measurement by two wattmeter method the reading of one of the wattmeters was zero. The power factor of the load must be

- (a) unity
- (b) 0.5
- (c) 0.3
- (d) zero

Ans: b

1219. The adjustment of position of shading bands, in an energy meter is done to provide

- (a) friction compensation
- (b) creep compensation
- (c) braking torque
- (d) none of the above

Ans: a

1220. An ohmmeter is a

- (a) moving iron instrument
- (b) moving coil instrument
- (c) dynamometer instrument
- (d) none of the above

Ans: b

1221. When a capacitor was connected to the terminal of ohmmeter, the pointer indicated a low resistance initially and then slowly came to infinity position. This shows that capacitor is

- (a) short-circuited
- (b) all right
- (c) faulty

Ans: b

1222. For measuring a very high resistance we should use

- (a) Kelvin's double bridge
- (b) Wheat stone bridge
- (c) Meggar
- (d) None of the above

Ans: c

1223. The electrical power to a megger is provided by

- (a) battery
- (b) permanent magnet D.C. generator
- (c) AC. generator
- (d) any of the above

Ans: b

1224. In a megger controlling torque is provided by

- (a) spring
- (b) gravity
- (c) coil
- (d) eddy current

Ans: c

1225. The operating voltage of a meggar is about

- (a) 6 V
- (b) 12 V
- (c) 40 V
- (d) 100 V

Ans: d

1226. Murray loop test can be used for location of

- (a) ground fault on a cable
- (b) short circuit fault on a cable
- (c) both the ground fault and the short-circuit fault
- (d) none of the above

Ans: c

1227. Which of the following devices should be used for accurate measurement of low D.C. voltage ?

- (a) Small range moving coil voltmeter
- (b) D.C. potentiometer
- (c) Small range thermocouple voltmeter
- (d) None of the above

Ans: b

1228. It is required to measure the true open circuit e.m.f. of a battery. The best device is

- (a) D.C. voltmeter
- (b) Ammeter and a known resistance
- (c) D.C. potentiometer
- (d) None of the above

Ans: c

1229. A voltage of about 200 V can be measured

- (a) directly by a D.C. potentiometer
- (b) a D.C. potentiometer in conjunction with a volt ratio box
- (c) a D.C. potentiometer in conjunction with a known resistance
- (d) none of the above

Ans: b

1230. A direct current can be measured by

- (a) a D.C. potentiometer directly
- (b) a D.C. potentiometer in conjunction with a standard resistance
- (c) a D.C. potentiometer in conjunction with a volt ratio box
- (d) none of the above

Ans: b

1231. To measure a resistance with the help of a potentiometer it is

- (a) necessary to standardise the potentiometer
- (b) not necessary to standardise the potentiometer
- (c) necessary to use a volt ratio box in conjunction with the potentiometer
- (d) none of the above

Ans: b

1232. A phase shifting transformer is used in conjunction with

- (a) D.C. potentiometer
- (b) Drysdale potentiometer
- (c) A.C. co-ordinate potentiometer
- (d) Crompton potentiometer

Ans: b

1233. Basically a potentiometer is a device for

- (a) comparing two voltages
- (b) measuring a current
- (c) comparing two currents
- (d) measuring a voltage
- (e) none of the above

Ans: a

1234. In order to achieve high accuracy, the slide wire of a potentiometer should be

- (a) as long as possible
- (b) as short as possible
- (c) neither too small not too large
- (d) very thick

Ans: a

1235. To measure an A. C. voltage by using an A.C. potentiometer, it is desirable that the supply for the potentiometer is taken

- (a) from a source which is not the same as the unknown voltage
- (b) from a battery
- (c) from the same source as the unknown voltage
- (d) any of the above

Ans: c

1236. The stator of phase shifting transformer for use in conjunction with an A.C. potentiometer usually has a

- (a) single-phase winding
- (b) two-phase winding
- (c) three-phase winding
- (d) any of the above

Ans: b

1237. In an AC. co-ordinate potentiometer, the currents in the phase and quadrature potentiometer are adjusted to be

- (a) out of phase by 90°
- (b) out of phase by 60°
- (c) out of phase by 30°
- (d) out of phase by 0°
- (e) out of phase by 180°

Ans: a

1238. A universal RLC bridge uses

- (a) Maxwell bridge configuration for measurement of inductance and De Santa's bridge for measurement of capacitance
- (b) Maxwell Wein bridge for measurement of inductance and modified De Santy's bridge for measurement of capacitance
- (c) Maxwell Wein bridge for measurement of inductance and Wein bridge for measurement of capacitance
- (d) Any of the above.

Ans: b

1239. For measurements on high voltage capacitors, the suitable bridge is

- (a) Wein bridge
- (b) Modified De Santy's bridge
- (c) Schering bridge
- (d) Any of the above
- (e) None of the above

Ans: c

1240. In an Anderson bridge, the unknown inductance is measured in terms of

- (a) known inductance and resistance
- (b) known capacitance and resistance
- (c) known resistance
- (d) known inductance

Ans: b

1241. Wagner earthing device is used to eliminate errors due to

- (a) electrostatic coupling
- (b) electromagnetic coupling
- (c) both (a) and (b)
- (d) none of the above

Ans: a

1242. For measurement of mutual inductance we can use

- (a) Anderson bridge
- (b) Maxwell's bridge
- (c) Heaviside bridge
- (d) Any of the above

Ans: c

1243. For measurement of inductance having high value, we should use

- (a) Maxwell's bridge
- (b) Maxwell Wein bridge
- (c) Hay's bridge
- (d) Any of the above

Ans: c

1244. If the current in a capacitor leads the voltage by 80° , the loss angle of the capacitor is

- (a) 10°
- (b) 80°
- (c) 120°
- (d) 170°

Ans: a

1245. In a Schering bridge the potential of the detector above earth potential is

- (a) a few volts only
- (b) 1 kV
- (c) 5 kV
- (d) 10 kV

Ans: a

1246. To avoid the effect of stray magnetic field in A.C. bridges we can use

- (a) magnetic screening
- (b) Wagner earthing device
- (c) wave filters
- (d) any of the above

Ans: a

1247. If an inductance is connected in one arm of bridge and resistances in the remaining three arms

- (a) the bridge can always be balanced
- (b) the bridge cannot be balanced
- (c) the bridge can be balanced if the resistances have some specific values

Ans: b

1248. A power factor meter has

- (a) one current circuit and two pressure circuits
- (b) one current circuit and one pressure circuit
- (c) two current circuits and one pressure circuit
- (d) none of the above

Ans: a

1249. The two pressure coils of a single phase power factor meter have

- (a) the same dimensions and the same number of turns
- (b) the same dimension but different number of turns
- (c) the same number of turns but different dimensions
- (d) none of the above

Ans: a

1250. In a single phase power factor meter the phase difference between the currents in the two pressure coils is

- (a) exactly 0°
- (b) approximately 0°
- (c) exactly 90°
- (d) approximately 90°

Ans: c

1251. In a dynamometer 3-phase power factor meter, the planes of the two moving coils are at

- (a) 0°
- (b) 60°
- (c) 90°
- (d) 120°

Ans: d

1252. In a vibrating reed frequency meter the natural frequencies of two adjacent reeds have a difference of

- (a) 0.1 Hz
- (b) 0.25 Hz
- (c) 0.5 Hz
- (d) 1.5 Hz

Ans: c

1253. In a Weston frequency meter, the magnetic axes of the two fixed coils are

- (a) parallel
- (b) perpendicular
- (c) inclined at 60°
- (d) inclined at 120°

Ans: b

1254. Weston frequency meter is

- (a) moving coil instrument
- (b) moving iron instrument
- (c) dynamometer instrument
- (d) none of the above

Ans: b

1255. A Weston synchronoscope is a

- (a) moving coil instrument
- (b) moving iron instrument
- (c) dynamometer instrument
- (d) none of the above

Ans: c

1256. In a Weston synchronoscope, the fixed coils are connected across

- (a) bus-bars
- (b) incoming alternator
- (c) a lamp
- (d) none of the above

Ans: b

1257. In Weston synchronoscope the moving coil is connected across

- (a) bus-bars
- (b) incoming alternator
- (c) fixed coils
- (d) any of the above

Ans: a

1258. The power factor of a single phase load can be calculated if the instruments available are

- (a) one voltmeter and one ammeter
- (b) one voltmeter, one ammeter and one wattmeter
- (c) one voltmeter, one ammeter and one energy meter
- (d) any of the above

Ans: b

1259. The desirable static characteristics of a measuring system are

- (a) accuracy and reproducibility
- (b) accuracy, sensitivity and reproducibility
- (c) drift and dead zone
- (d) static error

Ans: b

1260. The ratio of maximum displacement deviation to full scale deviation of the instrument is called

- (a) static sensitivity
- (b) dynamic deviation
- (c) linearity
- (d) precision or accuracy

Ans: c

1261. Systematic errors are

- (a) instrumental errors
- (b) environmental errors
- (c) observational errors
- (d) all of the above

Ans: d

1262. Standard resistor is made from

- (a) platinum
- (b) maganin
- (c) silver
- (d) nichrome

Ans: b

1263. Commonly used standard capacitor is

- (a) spherical type
- (b) concentric cylindrical type
- (c) electrostatic type
- (d) multilayer parallel plate type

Ans: b

1264. Operating torques in analogue instruments are

- (a) deflecting and control
- (b) deflecting and damping
- (c) deflecting, control and damping
- (d) vibration and balancing

Ans: c

1265. Commonly used instruments in power system measurement are

- (a) induction
- (b) moving coil or iron
- (c) rectifier
- (d) electrostatic

Ans: a

1266. Damping of the Ballistic galvanometer is made small to

- (a) get first deflection large
- (b) make the system oscillatory
- (c) make the system critically damped
- (d) get minimum overshoot

Ans: a

1267. If an instrument has cramped scale for larger values, then it follows

- (a) square law
- (b) logarithmic law
- (c) uniform law
- (d) none of the above

Ans: b

1268. Volt box is a component to

- (a) extend voltage range
- (b) measure voltage
- (c) compare voltage in a box
- (d) none of the above

Ans: a

1269. E.m.f. of a Weston cell is accurately measured by

- (a) electrostatic voltmeter
- (b) hot wire voltmeter
- (c) isothermal voltmeter
- (d) electrodynamic voltmeter

Ans: a

1270. The gravity controlled instrument has crowded scale because current is proportional to

- (a) balancing weight
- (b) deflection angle
- (c) sine of deflection angle

Ans: c

1271. A sensitive galvanometer produces large deflection for a

- (a) small value of current
- (b) large value of current
- (c) large value of power
- (d) large value of voltage
- (e) none of the above

Ans: a

1272. A multirange instrument has

- (a) multiple shunt or series resistances inside the meter
- (b) multicoin arrangement
- (c) variable turns of coil
- (d) multi range meters inside the measurement system
- (e) any of the above

Ans: a

1273. The rectifier instrument is not free from

- (a) temperature error
- (b) wave shape error
- (c) frequency error
- (d) all of the above

Ans: c

1274. Alternating current is measured by

- (a) induction ammeter
- (b) permanent magnet type ammeter
- (c) electrostatic ammeter
- (d) moving iron repulsion type voltmeter

Ans: a

1275. Most sensitive galvanometer is

- (a) elastic galvanometer
- (b) vibration galvanometer
- (c) Duddell galvanometer
- (d) spot ballistic galvanometer

Ans: d

1276. Instrument transformers are

- (a) potential transformers
- (b) current transformers
- (c) both (a) and (b)
- (d) power transformers

Ans: c

1277. An instrument transformer is used to extend the range of

- (a) induction instrument
- (b) electrostatic instrument
- (c) moving coil instrument
- (d) any of the above

Ans: a

1278. Wattmeter cannot be designed on the principle of

- (a) electrostatic instrument
- (b) thermocouple instrument
- (c) moving iron instrument
- (d) electrodynamic instrument

Ans: c

1279. In an energymeter braking torque is produced to

- (a) safe guard it against creep
- (b) brake the instrument
- (c) bring energy meter to stand still
- (d) maintain steady speed and equal to driving torque

Ans: d

1280. Various adjustments in an energy meter include

- (a) light load or friction
- (b) lag and creep
- (c) overload and voltage compensation
- (d) temperature compensation
- (e) all of the above

Ans: e

1281. The power of a n-phase circuit can be measured by using a minimum of

- (a) $(n - 1)$ wattmeter elements
- (b) n wattmeter elements
- (c) $(n + 1)$ wattmeter elements
- (d) $2n$ wattmeter elements

Ans: a

1282. Two holes in the disc of energymeter are drilled at the opposite sides of the spindle to

- (a) improve its ventilation
- (b) eliminate creeping at no load
- (c) increase its deflecting torque
- (d) increase its braking torque

Ans: b

1283. 107. Which of the following is measured by using a vector voltmeter ?

- (a) Amplifier gain and phase shift
- (b) Filler transfer functions
- (c) Complex insersion loss
- (d) All of the above

Ans: d

1284. The principle on which vector voltmeter is based is

- (a) that it works on the principle of complex variation
- (b) that it measures the response of linear ramp voltage
- (c) same as digital meter
- (d) that it measures the amplitude of a single at two points and at the same time measures their phase difference

Ans: d

1285. To measure radio frequency, the suitable frequency meter is

- (a) Weston frequency meter
- (b) reed vibrator frequency meter
- (c) heterodyne frequency meter
- (d) electrical resonance frequency meter

Ans: c

1286. What is the primary function of a surge arrester in an electrical system?

- A. Voltage amplification
- B. Current reduction
- C. Power factor correction
- D. Protection against voltage surges

Answer: D

1287. Which type of voltage spike is a surge arrester specifically designed to protect against?

- A. Steady-state voltage
- B. Transient voltage
- C. Alternating voltage
- D. DC voltage

Answer: B

1288. In a power distribution system, where is a surge arrester typically installed for effective protection?

- A. Near the generator
- B. Near the transformer
- C. Near the load center
- D. Near the circuit breaker

Answer: C

1289. What type of material is commonly used for the construction of surge arresters?

- A. Copper
- B. Aluminum
- C. Silicon
- D. Zinc

Answer: C

1290. What is the primary mechanism by which surge arresters divert excessive voltage?

- A. Voltage absorption
- B. Voltage attenuation
- C. Voltage diversion
- D. Voltage reflection

Answer: C

1291. How does a surge arrester differ from a circuit breaker in terms of operation?

- A. Circuit breakers protect against overcurrent; surge arresters protect against voltage surges.
- B. Surge arresters protect against overcurrent; circuit breakers protect against voltage surges.
- C. Both protect against overcurrent.
- D. Both protect against voltage surges.

Answer: A

1292. What is the significance of the “sparkover voltage” rating in surge arresters?

- A. The voltage at which the arrester starts conducting
- B. The voltage at which the arrester stops conducting
- C. The maximum operating voltage
- D. The voltage required for circuit initiation

Answer: A

1293. Why is it important for surge arresters to have a low residual voltage?

- A. To increase power factor
- B. To reduce energy consumption
- C. To minimize potential damage to equipment
- D. To regulate voltage fluctuations

Answer: C

1294. How do metal oxide surge arresters differ from other types?

- A. They have a higher sparkover voltage.
- B. They exhibit nonlinear voltage-current characteristics.
- C. They are made of copper.
- D. They are only effective for DC systems.

Answer: B

1295. What role does the “follow current” play in surge arrester operation?

- A. It represents the maximum operating current.
- B. It indicates the current that follows the voltage surge.
- C. It is the residual current after sparkover.
- D. It is unrelated to surge arrester operation.

Answer: C

1296. What is the purpose of the “energy handling capability” specification in surge arresters?

- A. To measure the speed of surge diversion
- B. To assess the arrester’s ability to absorb and dissipate energy
- C. To determine the sparkover voltage
- D. To calculate the follow current

Answer: B

1297. How do surge arresters contribute to the protection of sensitive electronic equipment in power systems?

- A. By increasing voltage levels
- B. By reducing power factor
- C. By diverting voltage surges to the ground
- D. By regulating current flow

Answer: C

1298. What is the role of a surge counter in the maintenance of surge arresters?

- A. To measure voltage levels
- B. To count the number of surges diverted
- C. To regulate the sparkover voltage
- D. To monitor follow current

Answer: B

1299. How does the “let-through voltage” of a surge arrester impact the connected equipment?

- A. Higher let-through voltage protects equipment better.
- B. Lower let-through voltage provides better protection.
- C. Let-through voltage has no impact on equipment protection.
- D. Let-through voltage determines equipment power consumption.

Answer: B

1300. What is the primary reason for using a combination of surge arresters with different voltage ratings in a power system?

- A. To increase the overall power factor
- B. To provide redundancy in surge protection
- C. To amplify the transient voltage
- D. To reduce the energy handling capability

Answer: B

1301. In what scenarios might a surge arrester fail to provide effective protection?

- A. During low-current conditions
- B. During high-current conditions
- C. During steady-state voltage
- D. During normal operating conditions

Answer: B

1302. How does the “impulse ratio” influence the performance of a surge arrester?

- A. Higher impulse ratio improves performance.
- B. Lower impulse ratio improves performance.
- C. Impulse ratio has no impact on performance.
- D. Impulse ratio regulates sparkover voltage.

Answer: A

1303. What measures can be taken to enhance the service life of surge arresters?

- A. Increasing the sparkover voltage
- B. Reducing the energy handling capability
- C. Implementing proper grounding
- D. Using surge arresters with the same voltage rating

Answer: C

1304. How does the location of a surge arrester installation impact its effectiveness?

- A. Proximity to the generator enhances performance.
- B. Proximity to the load center enhances performance.
- C. Installation location has no impact on performance.
- D. Proximity to the circuit breaker enhances performance.

Answer: B

1305. What is the role of the “residual voltage” specification in surge arrester performance?

- A. It determines the sparkover voltage.
- B. It indicates the voltage remaining across the arrester after surge diversion.
- C. It measures the follow current.
- D. It regulates the impulse ratio.

Answer: B

1306. What is the purpose of the “protective level” specification in surge arresters?

- A. To define the maximum voltage withstand capability
- B. To determine the follow current magnitude
- C. To indicate the voltage at which the arrester starts diverting surges
- D. To regulate the energy handling capability

Answer: C

1307. Why is it crucial to consider the ambient temperature when selecting surge arresters?

- A. Ambient temperature affects the surge arrester’s color
- B. Surge arresters are not affected by ambient temperature
- C. To ensure the arrester’s specified ratings are maintained
- D. Ambient temperature influences the sparkover voltage

Answer: C

1308. What role does the “varistor” play in the operation of a metal oxide surge arrester?

- A. To regulate the sparkover voltage
- B. To provide mechanical support to the arrester
- C. To absorb and divert surge currents
- D. To measure the follow current

Answer: C

1309. How does the voltage protection level of a surge arrester impact the connected equipment?

- A. Higher voltage protection level provides better protection
- B. Lower voltage protection level provides better protection
- C. Voltage protection level has no impact on equipment protection
- D. Voltage protection level determines the follow current

Answer: B

1310. What is the consequence of exceeding the maximum energy handling capability of a surge arrester?

- A. Improved surge protection
- B. Reduced follow current
- C. Potential damage to the surge arrester
- D. Increased sparkover voltage

Answer: C

1311. In surge arrester applications, what is the function of the “ground lead”?

- A. To regulate the sparkover voltage
- B. To provide a low-impedance path to the ground
- C. To measure the follow current
- D. To determine the energy handling capability

Answer: B

1312. How do surge arresters protect against overvoltages caused by lightning strikes?

- A. By increasing the follow current
- B. By reducing the sparkover voltage
- C. By diverting the lightning-induced surge to the ground
- D. By regulating the impulse ratio

Answer: C

1313. What is the significance of the “voltage protection level residual voltage” in surge arrester specifications?

- A. It indicates the voltage at which the arrester starts conducting
- B. It represents the maximum operating voltage
- C. It defines the voltage across the arrester after surge diversion
- D. It measures the follow current

Answer: C

1314. What is the role of the “arrester duty cycle” in surge arrester applications?

- A. To regulate the sparkover voltage
- B. To determine the energy handling capability
- C. To measure the follow current
- D. To assess the arrester’s ability to handle repetitive surges

Answer: D

1315. How does the “aging rate” specification impact the long-term performance of surge arresters?

- A. Higher aging rate improves performance
- B. Lower aging rate improves performance
- C. Aging rate has no impact on performance
- D. Aging rate influences the energy handling capability

Answer: B

1316. What is the primary difference between surge arresters and lightning rods in terms of functionality?

- A. Surge arresters provide a low-impedance path to the ground, while lightning rods absorb lightning strikes.
- B. Surge arresters regulate voltage fluctuations, while lightning rods divert high-frequency currents.
- C. Surge arresters protect against voltage surges, while lightning rods provide a path for lightning to reach the ground.
- D. Surge arresters control overcurrent conditions, while lightning rods enhance power factor.

Answer: C

1317. What is the significance of the “response time” specification in surge arrester performance?

- A. It measures the time it takes for the arrester to conduct after a surge event.
- B. It indicates the duration of the follow current.
- C. It regulates the sparkover voltage.
- D. It measures the energy handling capability.

Answer: A

1318. How do surge arresters contribute to the prevention of insulation breakdown in electrical systems?

- A. By increasing the sparkover voltage
- B. By regulating power factor
- C. By providing a low-impedance path for surges
- D. By controlling the let-through voltage

Answer: C

1319. What role does the “self-extinguishing capability” play in surge arrester safety?

- A. It measures the follow current magnitude.
- B. It regulates the sparkover voltage.
- C. It ensures the arrester extinguishes follow current quickly.
- D. It determines the energy handling capability.

Answer: C

1320. Why is it essential for surge arresters to be properly grounded?

- A. Grounding increases the sparkover voltage.
- B. Proper grounding reduces the energy handling capability.
- C. Grounding provides a low-impedance path for surge currents.
- D. Grounding has no impact on surge arrester performance.

Answer: C

1321. How does the “let-through energy” specification impact the protection provided by a surge arrester?

- A. Higher let-through energy provides better protection.
- B. Lower let-through energy provides better protection.
- C. Let-through energy has no impact on protection.
- D. Let-through energy determines the sparkover voltage.

Answer: B

1322. What is the purpose of the “insulation coordination” concept in surge arrester design?

- A. To improve power factor correction.
- B. To optimize the impulse ratio.
- C. To ensure compatibility with system insulation levels.
- D. To regulate the sparkover voltage.

Answer: C

1323. How does the “continuous operating voltage” specification influence surge arrester selection?

- A. It determines the energy handling capability.
- B. It regulates the sparkover voltage.
- C. It indicates the maximum continuous voltage the arrester can withstand.
- D. It measures the follow current.

Answer: C

1324. What challenges may arise if surge arresters are not periodically inspected and maintained?

- A. Reduced sparkover voltage
- B. Increased follow current
- C. Enhanced energy handling capability
- D. Potential degradation and failure

Answer: D

1325. capability” specification impact surge arrester performance in repetitive surge events?

- A. Higher duty cycle withstand capability improves performance.
- B. Lower duty cycle withstand capability improves performance.
- C. Duty cycle withstand capability has no impact on performance.
- D. Duty cycle withstand capability determines the sparkover voltage.

Answer: A

1326. How does the “pressure relief capability” contribute to the safety of surge arresters?

- A. It regulates the sparkover voltage.
- B. It ensures faster response time.
- C. It prevents arrester overheating by releasing internal pressure.
- D. It determines the let-through energy.

Answer: C

1327. In terms of construction, what material is commonly used for the varistor in a surge arrester?

- A. Copper
- B. Silicon
- C. Aluminum
- D. Zinc

Answer: B

1328. What is the purpose of the “creepage distance” in the design of surge arresters?

- A. To measure the follow current
- B. To determine the sparkover voltage
- C. To provide mechanical support
- D. To prevent arcing across the arrester surface

Answer: D

1329. How does the “overvoltage protection level” specification relate to the voltage protection level of a surge arrester?

- A. It represents the minimum voltage the arrester can handle.
- B. It is equivalent to the sparkover voltage.
- C. It indicates the maximum voltage the arrester can withstand.
- D. It measures the energy handling capability.

Answer: B

1330. How does the “nonlinear resistance” characteristic of a varistor in a surge arrester contribute to surge protection?

- A. It minimizes follow current.
- B. It enhances the sparkover voltage.
- C. It provides a low-impedance path during surges.
- D. It determines the let-through energy.

Answer: C

1331. What is the significance of the “class” designation in surge arrester specifications?

- A. It determines the energy handling capability.
- B. It regulates the sparkover voltage.
- C. It indicates the arrester’s response time.
- D. It defines the application and performance characteristics.

Answer: D

1332. How does the “temporary overvoltage withstand capability” specification contribute to surge arrester performance?

- A. It measures the energy handling capability.
- B. It indicates the maximum continuous voltage the arrester can withstand.
- C. It assesses the arrester’s ability to handle temporary overvoltages.
- D. It determines the impulse ratio.

Answer: C

1333. What is the role of the “follow current extinguishing time” in surge arrester specifications?

- A. To regulate the sparkover voltage.
- B. To measure the follow current magnitude.
- C. To determine the energy handling capability.
- D. To assess how quickly the arrester extinguishes follow current.

Answer: D

1334. What is the purpose of the “residual voltage at rated current” specification in surge arrester performance?

- A. To determine the impulse ratio.
- B. To measure the sparkover voltage.
- C. To indicate the voltage remaining across the arrester after rated current.
- D. To assess the arrester’s insulation coordination.

Answer: C

1335. How does the “installation category” impact the selection and placement of surge arresters?

- A. It determines the impulse ratio.
- B. It measures the energy handling capability.
- C. It defines the system’s insulation coordination.
- D. It indicates the specific application and environment for arrester installation.

Answer: D

1336. What role does the “aging process” play in the performance of surge arresters over time?

- A. Aging process improves surge arrester efficiency.
- B. Aging process accelerates follow current.
- C. Aging process may lead to degradation and reduced efficiency.
- D. Aging process determines the impulse ratio.

Answer: C

1337. How does the “coordinated protection” concept enhance the overall effectiveness of surge protection systems?

- A. Coordinated protection minimizes insulation coordination.
- B. Coordinated protection ensures synchronization with power factor correction.
- C. Coordinated protection optimizes the response time of individual protection devices.
- D. Coordinated protection increases the follow current magnitude.

Answer: C

1338. In surge arrester applications, what does the “maximum follow current” specification indicate?

- A. It measures the energy handling capability.
- B. It determines the sparkover voltage.
- C. It indicates the highest follow current that the arrester can handle.
- D. It regulates the let-through energy.

Answer: C

1339. What is the primary purpose of the “surge arrester duty cycle”?

- A. To measure the energy handling capability.
- B. To assess the arrester’s insulation coordination.
- C. To determine the sparkover voltage.
- D. To evaluate the arrester’s ability to handle repetitive surges.

Answer: D

1340. How does the “monitoring capability” of surge arresters contribute to maintenance practices?

- A. Monitoring capability determines the sparkover voltage.
- B. Monitoring capability counts the number of surges diverted.
- C. Monitoring capability measures the follow current magnitude.
- D. Monitoring capability has no impact on maintenance.

Answer: B

1341. What is the function of the “fault current withstand capability” in surge arresters?

- A. To determine the sparkover voltage.
- B. To regulate the let-through energy.
- C. To assess the arrester’s ability to handle fault currents.
- D. To measure the energy handling capability.

Answer: C

1342. How does the “temperature derating” influence the performance of surge arresters in elevated temperatures?

- A. Temperature derating improves performance.
- B. Temperature derating accelerates follow current.
- C. Temperature derating may be necessary to maintain performance in elevated temperatures.
- D. Temperature derating has no impact on performance.

Answer: C

1343. What is the significance of the “residual voltage at 10 kA” specification in surge arresters?

- A. It determines the sparkover voltage.
- B. It indicates the voltage remaining across the arrester after conducting a 10 kA surge.
- C. It measures the follow current magnitude.
- D. It regulates the let-through energy.

Answer: B

1344. What role does the “continuous operating current” specification play in surge arresters?

- A. It measures the energy handling capability.
- B. It determines the sparkover voltage.
- C. It indicates the maximum continuous current the arrester can handle.
- D. It regulates the let-through energy.

Answer: C

1345. How does the “mounting orientation” specification impact the installation of surge arresters?

- A. Mounting orientation determines the sparkover voltage.
- B. Mounting orientation has no impact on installation.
- C. Mounting orientation influences the follow current magnitude.
- D. Mounting orientation specifies the permissible positions for arrester installation.

Answer: D

1346. What is the significance of the “sealed design” in surge arresters?

- A. Sealed design has no impact on performance.
- B. Sealed design protects the arrester from environmental factors, ensuring longevity and reliability.
- C. Sealed design determines the sparkover voltage.
- D. Sealed design measures the follow current magnitude.

Answer: B

1347. How does the “thermal disconnect” feature enhance surge arrester safety?

- A. Thermal disconnect accelerates follow current.
- B. Thermal disconnect has no impact on safety.
- C. Thermal disconnect disconnects the arrester in case of overheating, preventing potential hazards.
- D. Thermal disconnect determines the sparkover voltage.

Answer: C

1348. What role does the “corrosion resistance” feature play in surge arresters?

- A. Corrosion resistance has no impact on performance.
- B. Corrosion resistance determines the sparkover voltage.
- C. Corrosion resistance enhances the arrester’s resistance to corrosive environments.
- D. Corrosion resistance measures the follow current magnitude.

Answer: C

- 1349. How does the “modular design” feature contribute to the flexibility of surge arresters in various applications?**
- A. Modular design has no impact on flexibility.
 - B. Modular design determines the sparkover voltage.
 - C. Modular design allows for customization and easy integration into different systems.
 - D. Modular design measures the energy handling capability.
- Answer: C
- 1350. What is the purpose of the “hybrid technology” in surge arresters?**
- A. Hybrid technology accelerates follow current.
 - B. Hybrid technology has no impact on performance.
 - C. Hybrid technology combines different protection methods to enhance overall surge protection.
 - D. Hybrid technology determines the sparkover voltage.
- Answer: C
- 1351. How does the “short-circuit withstand capability” feature contribute to the reliability of surge arresters?**
- A. Short-circuit withstand capability determines the sparkover voltage.
 - B. Short-circuit withstand capability has no impact on reliability.
 - C. Short-circuit withstand capability enhances the arrester’s ability to withstand short-circuit currents.
 - D. Short-circuit withstand capability measures the follow current magnitude.
- Answer: C
- 1352. What is the significance of the “ambient temperature range” specification in surge arresters?**
- A. Ambient temperature range determines the sparkover voltage.
 - B. Ambient temperature range has no impact on performance.
 - C. Ambient temperature range specifies the range of temperatures within which the arrester can operate effectively.
 - D. Ambient temperature range measures the energy handling capability.
- Answer: C
- 1353. How does the “failure mode” specification in surge arresters impact their overall safety?**
- A. Failure mode has no impact on safety.
 - B. Failure mode determines the sparkover voltage.
 - C. Failure mode specifies how the arrester behaves in the event of failure, ensuring safety.
 - D. Failure mode measures the follow current magnitude.
- Answer: C

- 1354. What is the role of the “self-healing capability” feature in surge arresters?**
- A. Self-healing capability accelerates follow current.
 - B. Self-healing capability has no impact on performance.
 - C. Self-healing capability allows the arrester to recover from partial failures and maintain functionality.
 - D. Self-healing capability determines the sparkover voltage.
- Answer: C
- 1355. How does the “frequency range” specification in surge arresters impact their compatibility with different electrical systems?**
- A. Frequency range determines the sparkover voltage.
 - B. Frequency range has no impact on compatibility.
 - C. Frequency range specifies the range of frequencies within which the arrester can operate effectively.
 - D. Frequency range measures the follow current magnitude.
- Answer: C
- 1356. How does the “self-extinguishing casing” feature in surge arresters contribute to safety?**
- A. Self-extinguishing casing determines the sparkover voltage.
 - B. Self-extinguishing casing has no impact on safety.
 - C. Self-extinguishing casing prevents the spread of fire by extinguishing itself, enhancing safety.
 - D. Self-extinguishing casing measures the energy handling capability.
- Answer: C
- 1357. What role does the “grounding system compatibility” specification play in surge arresters?**
- A. Grounding system compatibility determines the sparkover voltage.
 - B. Grounding system compatibility has no impact on performance.
 - C. Grounding system compatibility ensures the arrester is suitable for different grounding configurations.
 - D. Grounding system compatibility measures the follow current magnitude.
- Answer: C
- 1358. How does the “mounting accessories” specification impact the installation of surge arresters?**
- A. Mounting accessories determine the sparkover voltage.
 - B. Mounting accessories have no impact on installation.
 - C. Mounting accessories provide options and support for secure and efficient arrester installation.
 - D. Mounting accessories measure the energy handling capability.
- Answer: C

1359. What is the significance of the “resistance to environmental conditions” feature in surge arresters?

- A. Resistance to environmental conditions determines the sparkover voltage.
- B. Resistance to environmental conditions has no impact on performance.
- C. Resistance to environmental conditions ensures the arrester can withstand harsh weather and environmental factors.
- D. Resistance to environmental conditions measures the follow current magnitude.

Answer: C

1360. How does the “magnetic-free construction” feature in surge arresters impact their interference with nearby equipment?

- A. Magnetic-free construction determines the sparkover voltage.
- B. Magnetic-free construction has no impact on interference.
- C. Magnetic-free construction minimizes magnetic interference with nearby equipment.
- D. Magnetic-free construction measures the energy handling capability.

Answer: C

1361. What role does the “shielded design” feature play in surge arresters?

- A. Shielded design determines the sparkover voltage.
- B. Shielded design has no impact on performance.
- C. Shielded design reduces electromagnetic radiation, enhancing safety and minimizing interference.
- D. Shielded design measures the follow current magnitude.

Answer: C

1362. How does the “humidity resistance” specification impact the performance of surge arresters in humid environments?

- A. Humidity resistance determines the sparkover voltage.
- B. Humidity resistance has no impact on performance.
- C. Humidity resistance ensures that the arrester maintains optimal performance in humid conditions.
- D. Humidity resistance measures the energy handling capability.

Answer: C

1363. What is the purpose of the “integrated disconnect device” in surge arresters?

- A. Integrated disconnect device determines the sparkover voltage.
- B. Integrated disconnect device has no impact on performance.
- C. Integrated disconnect device allows for the isolation of the arrester for maintenance or replacement.
- D. Integrated disconnect device measures the follow current magnitude.

Answer: C

1364. How does the “reliable triggering mechanism” in surge arresters enhance their responsiveness to surges?

- A. Reliable triggering mechanism determines the sparkover voltage.
- B. Reliable triggering mechanism has no impact on responsiveness.
- C. Reliable triggering mechanism ensures a quick and consistent response to surges.
- D. Reliable triggering mechanism measures the energy handling capability.

Answer: C

1365. What role does the “convenient visual indication” feature play in surge arresters?

- A. Convenient visual indication determines the sparkover voltage.
- B. Convenient visual indication has no impact on performance.
- C. Convenient visual indication provides an easy and clear way to assess the arrester’s operational status.
- D. Convenient visual indication measures the follow current magnitude.

Answer: C

1366. How does the “extended lifespan design” feature in surge arresters contribute to their durability?

- A. Extended lifespan design determines the sparkover voltage.
- B. Extended lifespan design has no impact on durability.
- C. Extended lifespan design incorporates materials and technologies to prolong the arrester’s life.
- D. Extended lifespan design measures the energy handling capability.

Answer: C

1367. What role does the “compact form factor” play in the installation of surge arresters in confined spaces?

- A. Compact form factor determines the sparkover voltage.
- B. Compact form factor has no impact on installation.
- C. Compact form factor facilitates installation in confined spaces by requiring less physical space.
- D. Compact form factor measures the follow current magnitude.

Answer: C

1368. How does the “wide operating temperature range” specification in surge arresters impact their performance in diverse environments?

- A. Wide operating temperature range determines the sparkover voltage.
- B. Wide operating temperature range has no impact on performance.
- C. Wide operating temperature range ensures the arrester performs reliably across a broad range of temperatures.
- D. Wide operating temperature range measures the energy handling capability.

Answer: C

1369. What is the significance of the “fail-safe design” in surge arresters?

- A. Fail-safe design determines the sparkover voltage.
- B. Fail-safe design has no impact on safety.
- C. Fail-safe design minimizes the risk of catastrophic failure and ensures safe operation.
- D. Fail-safe design measures the energy handling capability.

Answer: C

1370. How does the “quick response time” feature in surge arresters contribute to their effectiveness?

- A. Quick response time determines the sparkover voltage.
- B. Quick response time has no impact on effectiveness.
- C. Quick response time ensures a rapid reaction to surges, providing swift protection to connected equipment.
- D. Quick response time measures the follow current magnitude.

Answer: C

1371. What role does the “conformal coating” feature play in surge arresters?

- A. Conformal coating determines the sparkover voltage.
- B. Conformal coating has no impact on performance.
- C. Conformal coating protects internal components from environmental factors, enhancing durability.
- D. Conformal coating measures the energy handling capability.

Answer: C

1372. How does the “smart grid compatibility” specification in surge arresters impact their integration into modern power systems?

- A. Smart grid compatibility determines the sparkover voltage.
- B. Smart grid compatibility has no impact on integration.
- C. Smart grid compatibility ensures seamless integration with modern power systems, supporting advanced grid technologies.
- D. Smart grid compatibility measures the follow current magnitude.

Answer: C

1373. What is the purpose of the “UV resistance” feature in surge arresters?

- A. UV resistance determines the sparkover voltage.
- B. UV resistance has no impact on performance.
- C. UV resistance protects the arrester from the harmful effects of ultraviolet radiation, maintaining its structural integrity.
- D. UV resistance measures the energy handling capability.

Answer: C

1374. How does the “single-pulse energy rating” specification in surge arresters provide information about their energy-handling capability?

- A. Single-pulse energy rating determines the sparkover voltage.
- B. Single-pulse energy rating has no impact on energy handling capability.
- C. Single-pulse energy rating quantifies the arrester’s ability to handle a single surge event, indicating its energy-handling capability.
- D. Single-pulse energy rating measures the follow current magnitude.

Answer: C

1375. What role does the “distributed design” feature play in surge arresters?

- A. Distributed design determines the sparkover voltage.
- B. Distributed design has no impact on functionality.
- C. Distributed design allows for multiple protection points, enhancing the overall surge protection coverage.
- D. Distributed design measures the follow current magnitude.

Answer: C

1376. How does the “non-linear voltage-current characteristic” in surge arresters contribute to their protective function?

- A. Non-linear voltage-current characteristic determines the sparkover voltage.
- B. Non-linear voltage-current characteristic has no impact on protection.
- C. Non-linear voltage-current characteristic allows the arrester to respond rapidly to voltage surges, providing effective protection.
- D. Non-linear voltage-current characteristic measures the energy handling capability.

Answer: C

1377. What role does the “fail-open design” play in the safety of surge arresters?

- A. Fail-open design determines the sparkover voltage.
- B. Fail-open design has no impact on safety.
- C. Fail-open design ensures that the arrester remains operational even in the event of a failure, contributing to safety.
- D. Fail-open design measures the energy handling capability.

Answer: C

1378. How does the “predictive maintenance features” in surge arresters enhance their overall reliability?

- A. Predictive maintenance features determine the sparkover voltage.
- B. Predictive maintenance features have no impact on reliability.
- C. Predictive maintenance features use advanced monitoring to anticipate potential issues, enhancing overall reliability.
- D. Predictive maintenance features measure the follow current magnitude.

Answer: C

1379. What is the significance of the “low residual voltage” specification in surge arresters?

- A. Low residual voltage determines the sparkover voltage.
- B. Low residual voltage has no impact on performance.
- C. Low residual voltage indicates the minimal voltage that remains after surge diversion, enhancing protection.
- D. Low residual voltage measures the energy handling capability.

Answer: C

1380. How does the “high discharge capacity” feature in surge arresters contribute to their effectiveness?

- A. High discharge capacity determines the sparkover voltage.
- B. High discharge capacity has no impact on effectiveness.
- C. High discharge capacity allows the arrester to handle large amounts of surge energy, ensuring effective protection.
- D. High discharge capacity measures the follow current magnitude.

Answer: C

1381. What role does the “frequency response” specification play in the compatibility of surge arresters with different electrical systems?

- A. Frequency response determines the sparkover voltage.
- B. Frequency response has no impact on compatibility.
- C. Frequency response specifies the range of frequencies to which the arrester can respond, ensuring compatibility with diverse electrical systems.
- D. Frequency response measures the energy handling capability.

Answer: C

1382. How does the “multi-stage protection” feature in surge arresters enhance their capability to safeguard sensitive equipment?

- A. Multi-stage protection determines the sparkover voltage.
- B. Multi-stage protection has no impact on capability.
- C. Multi-stage protection provides layered defense, safeguarding sensitive equipment against different types of surges.
- D. Multi-stage protection measures the follow current magnitude.

Answer: C

- 1383. What is the purpose of the “low let-through energy” specification in surge arresters?**
- A. Low let-through energy determines the sparkover voltage.
 - B. Low let-through energy has no impact on performance.
 - C. Low let-through energy indicates the minimal energy that passes through the arrester, reducing the impact on connected equipment.
 - D. Low let-through energy measures the energy handling capability.

Answer: C

- 1384. How does the “automatic self-test capability” in surge arresters contribute to their reliability?**
- A. Automatic self-test capability determines the sparkover voltage.
 - B. Automatic self-test capability has no impact on reliability.
 - C. Automatic self-test capability allows the arrester to perform regular self-tests, ensuring ongoing reliability.
 - D. Automatic self-test capability measures the follow current magnitude.

Answer: C

- 1385. What role does the “easy maintenance access” feature play in surge arresters?**
- A. Easy maintenance access determines the sparkover voltage.
 - B. Easy maintenance access has no impact on maintenance.
 - C. Easy maintenance access provides convenient access to internal components, facilitating straightforward maintenance.
 - D. Easy maintenance access measures the energy handling capability.

Answer: C

- 1386. How does the “compact surge arrester design” contribute to its versatility in installation?**
- A. Compact design determines the sparkover voltage.
 - B. Compact design has no impact on versatility.
 - C. Compact design allows for flexible installation in various spaces, enhancing versatility.
 - D. Compact design measures the energy handling capability.

Answer: C

- 1387. What role does the “follow current capability” specification play in assessing surge arrester performance?**
- A. Follow current capability determines the sparkover voltage.
 - B. Follow current capability has no impact on performance.
 - C. Follow current capability indicates the arrester’s ability to handle residual currents, assessing its performance.
 - D. Follow current capability measures the energy handling capability.

Answer: C

1388. How does the “adaptive triggering technology” in surge arresters enhance their responsiveness?

- A. Adaptive triggering technology determines the sparkover voltage.
- B. Adaptive triggering technology has no impact on responsiveness.
- C. Adaptive triggering technology adjusts the arrester’s response based on the surge characteristics, enhancing responsiveness.
- D. Adaptive triggering technology measures the follow current magnitude.

Answer: C

1389. What is the significance of the “continuous monitoring capability” in surge arresters?

- A. Continuous monitoring capability determines the sparkover voltage.
- B. Continuous monitoring capability has no impact on capability.
- C. Continuous monitoring capability allows for ongoing surveillance of the arrester’s status, ensuring optimal performance.
- D. Continuous monitoring capability measures the energy handling capability.

Answer: C

1390. How does the “corrosion-resistant materials” feature in surge arresters impact their longevity?

- A. Corrosion-resistant materials determine the sparkover voltage.
- B. Corrosion-resistant materials have no impact on longevity.
- C. Corrosion-resistant materials protect the arrester from corrosion, enhancing longevity and durability.
- D. Corrosion-resistant materials measure the follow current magnitude.

Answer: C

1391. What role does the “remote monitoring capability” play in the management of surge arresters?

- A. Remote monitoring capability determines the sparkover voltage.
- B. Remote monitoring capability has no impact on management.
- C. Remote monitoring capability enables users to monitor and manage surge arresters from a distance, enhancing efficiency in management.
- D. Remote monitoring capability measures the energy handling capability.

Answer: C

1392. How does the “modular design” feature contribute to the adaptability of surge arresters?

- A. Modular design determines the sparkover voltage.
- B. Modular design has no impact on adaptability.
- C. Modular design allows for the addition or removal of modules, enhancing adaptability to changing requirements.
- D. Modular design measures the energy handling capability.

Answer: C

1393. What is the significance of the “integrated surge counter” in surge arresters?

- A. Integrated surge counter determines the sparkover voltage.
- B. Integrated surge counter has no impact on performance.
- C. Integrated surge counter counts and records the number of surges the arrester has experienced, aiding in maintenance decisions.
- D. Integrated surge counter measures the energy handling capability.

Answer: C

1394. How does the “thermal protection feature” in surge arresters contribute to their safety?

- A. Thermal protection feature determines the sparkover voltage.
- B. Thermal protection feature has no impact on safety.
- C. Thermal protection feature prevents overheating, enhancing safety by protecting the arrester from thermal damage.
- D. Thermal protection feature measures the follow current magnitude.

Answer: C

1395. What role does the “high surge current capacity” specification play in assessing surge arrester capabilities?

- A. High surge current capacity determines the sparkover voltage.
- B. High surge current capacity has no impact on capabilities.
- C. High surge current capacity indicates the arrester’s ability to handle high levels of surge current, assessing its capabilities.
- D. High surge current capacity measures the energy handling capability.

Answer: C

1396. “The mass of an ion liberated at an electrode is directly proportional to the quantity of electricity”. The above statement is associated with

- A. Newton’s law
- B. Faraday’s law of electromagnetic
- C. Faraday’s law of electrolysis
- D. Gauss’s law

Answer: C

1397. The charge required to liberate one gram equivalent of any substance is known as _____ constant

- A. time
- B. Faraday's
- C. Boltzman
- D. Gauss's

Answer: B

1398. During the charging of a lead-acid cell

- A. its voltage increases
- B. it gives out energy
- C. its cathode becomes dark chocolate brown in colour
- D. specific gravity of H_2SO_4 decreases

Answer: A

1399. The capacity of a lead-acid cell does not depend on its

- A. temperature
- B. rate of charge
- C. rate of discharge
- D. quantity of active material

Answer: B

1400. During charging the specific gravity of the electrolyte of a lead-acid battery

- A. increases
- B. decreases
- C. remains the same
- D. becomes zero

Answer: A

1401. The active materials on the positive and negative plates of a fully charged lead-acid battery are

- A. lead and lead peroxide
- B. lead sulphate and lead
- C. lead peroxide and lead
- D. none of the above

Answer: C

1402. When a lead-acid battery is in fully charged condition, the color of its positive plate is

- A. dark grey
- B. brown
- C. dark brown
- D. none of above

Answer: C

1403. The active materials of a nickel-iron battery are

- A. nickel hydroxide
- B. powdered iron and its oxide
- C. 21% solution of KOH
- D. all of the above

Answer: D

1404. The ratio of ampere-hour efficiency to watt-hour efficiency of a lead-acid cell is

- A. just one
- B. always greater than one
- C. always less than one
- D. none of the above.

Answer: B

1405. The best indication about the state of charge on a lead-acid battery is given by

- A. output voltage
- B. temperature of electrolyte
- C. specific gravity of electrolyte
- D. none of the above

Answer: C

1406. The storage battery generally used in electric power station is

- A. nickel-cadmium battery
- B. zinc-carbon battery
- C. lead-acid battery
- D. none of the above

Answer: C

1407. The output voltage of a charger is

- A. less than the battery voltage
- B. higher than the battery voltage
- C. the same as the battery voltage
- D. none of the above

Answer: B

1408. Cells are connected in series in order to

- A. increase the voltage rating
- B. increase the current rating
- C. increase the life of the cells
- D. none of the above

Answer: A

1409. Five 2 V cells are connected in parallel. The output voltage is

- A. 1 V
- B. 1.5 V
- C. 1.75 V
- D. 2 V

Answer: D

1410. The capacity of a battery is expressed in terms of

- A. current rating
- B. voltage rating
- C. ampere-hour rating
- D. none of the above

Answer: C

1411. During the charging and discharging of a nickel-iron cell

- A. corrosive fumes are produced
- B. water is neither formed nor absorbed
- C. nickel hydroxide remains unsplit
- D. its e.m.f. remains constant

Answer: B

1412. As compared to constant-current system, the constant-voltage system of charging a lead acid cell has the advantage of

- A. reducing time of charging
- B. increasing cell capacity
- C. both A and B
- D. avoiding excessive gassing

Answer: C

1413. A dead storage battery can be revived by

- A. adding distilled water
- B. adding so-called battery restorer
- C. a dose of H_2SO_4
- D. none of the above

Answer: D

1414. As compared to a lead-acid cell, the efficiency of a nickel-iron cell is less due to its

- A. compactness
- B. lower e.m.f.
- C. small quantity of electrolyte used
- D. higher internal resistance

Answer: D

1415. Trickle charging of a storage battery helps to

- A. maintain proper electrolyte level
- B. increase its reserve capacity
- C. prevent sulphation
- D. keep it fresh and fully charged

Answer: D

1416. Those substances of the cell which take active part in chemical combination and hence produce electricity during charging or discharging are known as _____ materials.

- A. passive
- B. active
- C. redundant
- D. inert

Answer: B

1417. In a lead-acid cell dilute sulfuric acid (electrolyte) approximately comprises the following

- A. one part H_2O , three parts H_2SO_4
- B. two parts H_2O , two parts H_2SO_4
- C. three parts H_2O , one part H_2SO_4
- D. all H_2SO_4

Answer: C

1418. It is noticed that during charging

- A. there is a rise in voltage
- B. energy is absorbed by the cell
- C. specific gravity of H_2SO_4 is increased
- D. all of the above

Answer: D

1419. It is noticed that during discharging the following does not happen

- A. both anode and cathode become $PbSO_4$
- B. specific gravity of H_2SO_4 decreases
- C. voltage of the cell decreases
- D. the cell absorbs energy

Answer: D

1420. The ampere-hour efficiency of a lead-acid cell is normally between

- A. 20 to 30%
- B. 40 to 50%
- C. 60 to 70%
- D. 90 to 95%

Answer: D

1421. The watt-hour efficiency of a lead-acid cell varies between

- A. 25 to 35%
- B. 40 to 60%
- C. 70 to 80%
- D. 90 to 95%

Answer: C

1422. The capacity of a lead-acid cell is measured in

- A. amperes
- B. ampere-hours
- C. watts
- D. watt-hours

Answer: B

1423. The capacity of a lead-acid cell depends on

- A. rate of discharge
- B. temperature
- C. density of electrolyte
- D. all above

Answer: D

1424. When the lead-acid cell is fully charged, the electrolyte assumes _____ appearance

- A. dull
- B. reddish
- C. bright
- D. milky

Answer: D

1425. The e.m.f. of an Edison cell, when fully charged, is nearly

- A. 1.4 V
- B. 1 V
- C. 0.9 V
- D. 0.8 V

Answer: A

1426. The internal resistance of an alkali cell is nearly _____ times that of the lead-acid cell.

- A. two
- B. three
- C. four
- D. five

Answer: D

1427. The average charging voltage for alkali cell is about

- A. 1 V
- B. 1.2 V
- C. 1.7 V
- D. 2.1 V

Answer: C

1428. On the average the ampere-hour efficiency of an Edison cell is about

- A. 40%
- B. 60%
- C. 70%
- D. 80%

Answer: D

1429. The active material of the positive plates of silver-zinc batteries is

- A. silver oxide
- B. lead oxide
- C. lead
- D. zinc powder

Answer: A

1430. Lead-acid cell has a life of nearly charges and discharges

- A. 500
- B. 700
- C. 1000
- D. 1250

Answer: D

1431. Life of the Edison cell is at least

- A. five years
- B. seven years
- C. eight years
- D. ten years

Answer: A

1432. The internal resistance of a lead-acid cell is that of Edison cell

- A. less than
- B. more than
- C. equal to
- D. none of the above

Answer: A

1433. Electrolyte used in an Edison cell is

- A. NaOH
- B. KOH
- C. HCl
- D. HNO₃

Answer: B

1434. Electrolyte used in a lead-acid cell is

- A. NaOH
- B. only H₂SO₄
- C. only water
- D. dilute H₂SO₄

Answer: D

1435. Negative plate of an Edison cell is made of

- A. copper
- B. lead
- C. iron
- D. silver oxide

Answer: C

1436. The open circuit voltage of any storage cell depends wholly upon

- A. its chemical constituents
- B. on the strength of its electrolyte
- C. its temperature
- D. all above

Answer: D

1437. The specific gravity of electrolyte is measured by

- A. manometer
- B. a mechanical gauge
- C. hydrometer
- D. psychrometer

Answer: C

1438. When the specific gravity of the electrolyte of a lead-acid cell is reduced to 1.1 to 1.15 the cell is in

- A. charged state
- B. discharged state
- C. both A. and B
- D. active state

Answer: B

1439. In _____ system the charging current is intermittently controlled at either a maximum or minimum value

- A. two rate charge control
- B. trickle charge
- C. floating charge
- D. an equalizing charge

Answer: A

1440. Over charging

- A. produces excessive gassing
- B. loosens the active material
- C. increases the temperature resulting in buckling of plates
- D. all above

Answer: D

1441. Undercharging

- A. reduces specific gravity of the electrolyte
- B. increases specific gravity of the electrolyte
- C. produces excessive gassing
- D. increases the temperature

Answer: A

1442. Internal short circuits are caused by

- A. breakdown of one or more separators
- B. excess accumulation of sediment at the bottom of the cell
- C. both A. and B
- D. none of the above

Answer: C

1443. The effect of sulphation is that the internal resistance

- A. increases
- B. decreases
- C. remains same
- D. none of the above

Answer: A

1444. Excessive formation of lead sulphate on the surface of the plates happens because of

- A. allowing a battery to stand in discharged condition for a long time
- B. topping up with electrolyte
- C. persistent undercharging
- D. low level of electrolyte
- E. all above

Answer: E

1445. The substances which combine together to store electrical energy during the charge are called _____ materials

- A. active
- B. passive
- C. inert
- D. dielectric

Answer: A

1446. In a lead-acid cell, lead is called as

- A. positive active material
- B. negative active material
- C. passive material
- D. none of the above

Answer: B

1447. The lead-acid cell should never be discharged beyond

- A. 1.8 V
- B. 1.9 V
- C. 2 V
- D. 2.1 V

Answer: A

1448. On overcharging a battery

- A. it will bring about chemical change in active materials
- B. it will increase the capacity of the battery
- C. it will raise the specific gravity of the electrolyte
- D. none of the above will occur

Answer: D

1449. Each cell has a vent cap

- A. to allow gases out when the cell is on charge
- B. to add water to the cell if needed
- C. to check the level of electrolyte
- D. to do all above functions

Answer: D

1450. Following will occur if level of electrolyte falls below plates

- A. capacity of the cell is reduced
- B. life of the cell is reduced
- C. open plates are converted to lead sulphate
- D. all above

Answer: D

1451. In constant voltage charging method, the charging current from discharged to fully charged condition

- A. decreases
- B. increases
- C. remains constant
- D. none of the above

Answer: A

1452. ampere-hour capacity would deliver a current of

- A. 48 amperes for 1 hour
- B. 24 amperes for 2 hours
- C. 8 amperes for 6 hours
- D. 6 amperes for 8 hours

Answer: D

1453. In constant-current charging method, the supply voltage from discharged to fully charged condition

- A. decreases
- B. increases
- C. remains constant
- D. none of the above

Answer: B

1454. Battery charging equipment is generally installed

- A. in well ventilated location
- B. in clean and dry place
- C. as near as practical to the battery being charged
- D. in location having all above features

Answer: D

1455. Following will happen if the specific gravity of electrolyte becomes more than 1.23.

- A. Loss of capacity
- B. Loss of life
- C. Corrosion of the grids of the plate
- D. All above

Answer: D

1456. Batteries are charged by

- A. rectifiers
- B. engine generator sets
- C. motor generator sets
- D. any one of the above methods

Answer: D

1457. Cell short circuit results in

- A. low sp. gravity electrolyte
- B. abnormal high temperature
- C. reduced gassing on charge
- D. all above

Answer: D

1458. Internal resistance of a cell is reduced by

- A. using vent plug to permit gas formed during discharge
- B. increasing the plate area
- C. putting plates very close together
- D. all above methods

Answer: D

1459. Capacity of dry cells is

- A. more when it is supplying current for intermittent periods
- B. more when it is supplying current for continuous periods
- C. unaffected by the type of discharge
- D. none of the above

Answer: A

1460. Battery container should be acid resistance, therefore it is made up of

- A. glass
- B. plastic
- C. wood
- D. all above

Answer: D

1461. Sulphated cells are indicated by

- A. the loss of capacity of the cell
- B. the decrease of the specific gravity
- C. the low voltage of the cell on discharge
- D. all above conditions

Answer: D

1462. In a lead-acid cell, if the specific gravity of sulphuric acid is 1.8, it will require following ratio of acid to water to get mixture of specific gravity of 1.3

- A. 6 parts of acid to 4 parts of water
- B. 4 parts of acid to 4 parts of water
- C. 4 parts of acid to 6 parts of water
- D. 4 parts of acid to 8 parts of water

Answer: C

1463. Local action in a battery is indicated by

- A. excessive gassing under load conditions
- B. excessive drop in the specific gravity of electrolyte even when the cell is on open circuit
- C. both A. and B
- D. none of the above

Answer: D

1464. Following will happen if battery charging rate is too high

- A. excessive gassing will occur
- B. temperature rise will occur
- C. bulging and buckling of plates will occur
- D. all above will occur

Answer: D

1465. Internal resistance of a cell is due to

- A. resistance of electrolyte
- B. electrode resistance
- C. surface contact resistance between electrode and electrolyte
- D. all above

Answer: D

1466. If a battery is wrongly connected on charge following will happen

- A. current delivered by the battery will be high
- B. current drawing will be nil
- C. current drawing will be very small
- D. current drawing will be very high

Answer: D

1467. In order that a hydrometer may float vertically in electrolyte its C.G. should be

- A. lowered
- B. raised
- C. undisturbed
- D. displaced sideways

Answer: A

1468. If a lead-acid cell is discharged below 1.8 V the following will happen.

- A. Capacity of cell will reduce
- B. Sulphation of plates will occur
- C. Internal resistance will increase
- D. All above will occur

Answer: D

1469. Life of the batteries is in the following ascending order.

- A. Lead-acid cell, Edison cell, Nickel cadmium cell
- B. Lead-acid cell, Nickel-cadmium cell, Edison cell
- C. Edison cell, Nickel-cadmium cell, lead-acid cell
- D. Nickel-cadmium cell, Edison cell, lead-acid cell

Answer: A

1470. Persons preparing electrolyte should wear

- A. goggles or other face shield
- B. rubber
- C. rubber boots and gloves
- D. all above safety devices

Answer: D

1471. Excessive charging a battery tends to

- A. produce gassing
- B. increase the internal resistance of the battery
- C. to corrode the positive plates into lead peroxide thereby weakening them physically
- D. bring about all above changes

Answer: D

1472. Shelf life of a small dry cell is

- A. equal to that of large dry cell
- B. less than that of large dry cell
- C. more than that of large dry cell
- D. none of the above

Answer: B

1473. The current flow through electrolyte is due to the movement of

- A. ions
- B. holes
- C. electrons
- D. none of the above

Answer: A

1474. Level of electrolyte in a cell should be _____ the level of plates

- A. below
- B. equal to
- C. above
- D. none of the above

Answer: C

1475. During discharge, the active material of both the positive and negative plates is changed to

- A. Pb
- B. PbO₂
- C. PbO
- D. PbSO₄

Answer: D

1476. _____ of electrolyte indicates the state of charge of the battery

- A. colour
- B. mass
- C. viscosity
- D. specific gravity

Answer: D

1477. The following indicate that battery on charge has attained full charge

- A. colour of electrode
- B. gassing
- C. specific gravity
- D. all above

Answer: D

1478. Dry cell is modification of

- A. Daniell cell
- B. Leclanche cell
- C. Lead-acid cell
- D. Edison cell

Answer: B

1479. Capacity of a battery is expressed in

- A. Ah
- B. Vh
- C. Wh
- D. kWh

Answer: A

1480. In alkaline cell the electrolyte is

- A. dilute sulphuric acid
- B. concentrated sulphuric acid
- C. NaOH
- D. KOH

Answer: D

1481. Self charge of a Ni-Fe cell is _____ Edison cell.

- A. equal to
- B. less than
- C. more than
- D. much more than

Answer: B

1482. Ampere hour capacity of an industrial battery is based on _____ hours discharge rate.

- A. 8
- B. 12
- C. 16
- D. 24

Answer: A

1483. The body of Edison cell is made of

- A. bakelite
- B. rubber
- C. nickel plated steel
- D. aluminium

Answer: C

1484. Specific gravity of electrolyte in Edison cell is

- A. 0.8
- B. 0.95
- C. 1.1
- D. 1.21

Answer: D

1485. All the electrical connections between the battery and vehicle should be by

- A. thin aluminium wires
- B. thin copper wires
- C. rigid cables
- D. flexible cables

Answer: D

1486. A battery of 6 cells will show a drop of _____ volts from fully charged state to fully discharged state.

- A. 1.0
- B. 1.5
- C. 2.4
- D. 2.9

Answer: C

1487. During the idle period of the battery, strong electrolyte tends to change the active material of the cell into

- A. PbO_2
- B. PbSO_4
- C. PbO
- D. Pb

Answer: B

1488. Charging of sulphated battery produces _____ heat.

- A. no
- B. very little
- C. less
- D. more

Answer: D

1489. Hydrogen evolved during charging produces explosive mixture when it is more than

- A. 2%
- B. 4%
- C. 6%
- D. 8%

Answer: D

1490. Weston standard cell at 20°C has voltage of _____ volts.

- A. 0.8
- B. 0.9
- C. 1.0187
- D. 1.5

Answer: C

1491. Extent of corrosion in the underground metal work depends upon

- A. amount of moisture
- B. type of metals
- C. type of soil chemicals
- D. all above factors

Answer: D

1492. Mercury cell has which of the following characteristics ?

- A. Flat discharge current-voltage curve
- B. High power to weight ratio
- C. Comparatively longer shelf life under adverse conditions of high temperature and humidity
- D. All of the above

Answer: D

1493. Charging a sulphated battery at high rate results in

- A. boiling of electrolyte due to gassing
- B. warping of plates
- C. damage to separators, cell caps covers and battery case due to excessive temperature
- D. all above

Answer: D

1494. Short circuiting of a cell may be caused

- A. buckling of plates
- B. faulty separators
- C. lead particles forming circuit between positive and negative plates
- D. All of the above

Answer: D

1495. In a battery cover is placed over the element and sealed to the top of the battery container. This is done

- A. to reduce evaporation of water from electrolyte
- B. to exclude dirt and foreign matter from the electrolyte
- C. to discharge both of the above functions
- D. to discharge none of the above functions

Answer: C

1496. For a cell to work, which of the following condition(s) become necessary ?

- A. Two electrodes of different meta's should be inserted in the electrolyte, not touching each other
- B. Electrolyte must chemically react with one of the electrodes
- C. Electrolyte liquid or paste should be conducting
- D. All above three conditions are necessary

Answer: D

1497. Which of the following primary cells has the lowest voltage ?

- A. Lithium
- B. Zinc-chloride
- C. Mercury
- D. Carbon-zinc

Answer: C

1498. Which of the following primary cells has the highest voltage ?

- A. Manganese-alkaline
- B. Carbon-zinc
- C. Lithium
- D. Mercury

Answer: C

1499. While preparing electrolyte for a lead-acid battery

- A. water is poured into acid
- B. acid is poured into water
- C. anyone of the two can be added to other chemical

Answer: B

1500. Which of the following battery is used for air-craft ?

- A. Lead-acid battery
- B. Nickel-iron battery
- C. Dry cell battery
- D. Silver oxide battery

Answer: B

1501. Which of the following cell has a reversible chemical reaction ?

- A. Lead-acid
- B. Mercury oxide
- C. Carbon-zinc
- D. Silver-oxide

Answer: A

1502. Which of the following is incorrect ?

- A. A storage cell has a reversible chemical reaction
- B. A lead-acid cell can be recharged
- C. A carbon-zinc cell has unlimited shelf life
- D. A primary cell has an irreversible chemical reaction

Answer: C

1503. Which of the following has lower sp. gravity ?

- A. Dilute H_2SO_4
- B. Concentrated H_2SO_4
- C. Water
- D. Any of the above

Answer: C

1504. Under normal charging rate, the charging current should be

- A. 10% of capacity
- B. 20% of capacity
- C. 30% of capacity
- D. 40% of capacity

Answer: A

1505. When two batteries are connected in parallel, it should be ensured that

- A. they have same e.m.f.
- B. they have same make
- C. they have same ampere-hour capacity
- D. they have identical internal resistance

Answer: A

1506. A typical output of a solar cell is

- A. 0.1V
- B. 0.26 V
- C. 1.1 V
- D. 2 V

Answer: B

1507. Petroleum jelly is applied to the electrical connections to the lead-acid battery

- A. prevent local heating
- B. prevent short-circuiting
- C. reduce path resistance
- D. prevent corrosion

Answer: D

1508. When the load resistance equals the generator resistance which of the following will be maximum ?

- A. Current
- B. Efficiency of the circuit
- C. Power in the load resistance
- D. Voltage across the load resistance

Answer: C

1509. The common impurity in the electrolyte of lead-acid battery is

- A. chlorine
- B. dust particles
- C. lead crystals
- D. iron

Answer: D

1510. In a lead-acid battery the energy is stored in the form of

- A. charged ions
- B. chemical energy
- C. electrostatic energy
- D. electromagnetic energy

Answer: B

1511. Which among the following constitutes the major load for an automobile battery ?

- A. Brake light
- B. Self starter
- C. Parking lights
- D. Spark plugs

Answer: B

1512. Which of the following factors adversely affects the capacity of the leadacid battery ?

- A. Temperature of surroundings
- B. Specific gravity of electrolyte
- C. Rate of discharge
- D. All of the above

Answer: D

1513. Cells are connected in parallel to

- A. increase the efficiency
- B. increase the current capacity
- C. increase the voltage output
- D. increase the internal resistance

Answer: B

1514. A constant-voltage generator has

- A. minimum efficiency
- B. minimum current capacity
- C. low internal resistance
- D. high internal resistance

Answer: C

1515. Satellite power requirement is provided through

- A. solar cells
- B. dry cells
- C. nickel-cadmium cells
- D. lead-acid batteries

Answer: A

1516. What is the primary function of a fuse in an electrical circuit?

- A. To interrupt the flow of current when it exceeds a predetermined safe limit.
- B. To control the voltage level in the circuit.
- C. To act as a heat sink for the electrical components.
- D. To provide a connection point for multiple wires.

Answer: A

1517. Which material is commonly used in a fuse element due to its low melting point and high resistance?

- A. Copper
- B. Tin
- C. Aluminum
- D. Steel

Answer: B

1518. What factors influence the current rating of a fuse?

- A. Length and diameter of the element
- B. Both A and C
- C. Material composition of the element
- D. Voltage level of the circuit

Answer: B

1519. Which type of fuse is designed for quick response and precise tripping at specific current levels?

- A. Time-delay fuse
- B. Fast-acting fuse
- C. Cartridge fuse
- D. Resettable fuse

Answer: B

1520. What is the advantage of a cartridge fuse over a traditional glass fuse?

- A. Increased voltage rating
- B. Enhanced safety due to enclosed construction
- C. Easier visual inspection of the element
- D. Lower cost and wider availability

Answer: B

1521. What can cause a fuse to blow prematurely, even at normal current levels?

- A. Excessive ambient temperature
- B. Both A and C
- C. Loose connections or corrosion on the fuse holder
- D. Over Tightening of the fuse in the holder

Answer: B

1522. What should you NEVER do after a fuse blows in an electrical circuit?

- A. Disconnect the power supply immediately.
- B. Check for the cause of the overload before replacing the fuse.
- C. Attempt to reset or bypass the fuse.
- D. Replace the fuse with a higher-rated one to prevent future blowouts.

Answer: C

1523. Which type of fuse is suitable for household applications due to its affordability and ease of replacement?

- A. High-voltage fuse
- B. Automotive fuse
- C. Liquid-filled fuse
- D. Plug fuse

Answer: D

1524. What is the purpose of a time-delay fuse in a motor circuit?

- A. Precise tripping under short-circuit conditions.
- B. Controlled response to accommodate motor starting current surges.
- C. Increased protection against voltage spikes.
- D. Faster reaction to protect sensitive electronics.

Answer: B

1525. What does the “interrupting rating” of a fuse indicate?

- A. Maximum voltage it can withstand.
- B. Maximum fault current it can safely interrupt.
- C. Operating temperature range of the element.
- D. Current rating under normal operating conditions.

Answer: B

1526. What is the main disadvantage of using resettable fuses compared to traditional fuses?

- A. Higher cost and limited availability.
- B. Slower response time and potential for overheating.
- C. Increased risk of electrical shock due to exposed elements.
- D. Difficulty in visually identifying a blown state.

Answer: B

1527. How can you differentiate between a blown cartridge fuse and a good one without removing it from the holder?

- A. By visually inspecting the element through the transparent window (if available).
- B. Using a continuity tester to check for an open circuit across the fuse.
- C. Measuring the voltage drop across the fuse while the circuit is energized.
- D. Shaking the holder to listen for rattling sound from the element.

Answer: B

1528. What type of fuse is commonly used in automotive applications due to its compact size and vibration resistance?

- A. Blade fuse
- B. Microfuse
- C. High-rupture capacity fuse
- D. Time-lag fuse

Answer: B

1529. What safety precautions should you take when replacing a blown fuse?

- A. Wear insulated gloves and safety glasses.
- B. Always work on a de-energized circuit.
- C. Use a screwdriver or pliers to grip the fuse firmly.
- D. Replace the fuse with one of the same rating and type.

Answer: B

1530. Which statement is TRUE about arc quenching in high-voltage fuses?

- A. It is not necessary for low-voltage applications.
- B. It involves using special materials or chambers to rapidly extinguish the arc formed during overload.
- C. It can be achieved by increasing the air gap between the fuse element and the contacts.
- D. Arc quenching has no impact on the overall safety of the fuse.

Answer: B

1531. What is the primary function of a fuse indicator in a cartridge fuse?

- A. Provide visual confirmation of a blown fuse.
- B. Increase the interrupting rating of the fuse.
- C. Act as a heat sink for the element.
- D. Measure the current flowing through the circuit.

Answer: A

1532. How does a liquid-filled fuse operate differently from a traditional solid-type fuse?

- A. It uses a magnetic field to interrupt the current.
- B. The liquid expands and extinguishes the arc when overloaded.
- C. It has a higher voltage rating due to the insulating properties of the liquid.
- D. It provides slower response time for motor circuit protection.

Answer: B

1533. What potential hazard can arise from using an oversized fuse in a circuit?

- A. Increased risk of overheating and fire.
- B. Reduced protection against short circuits.
- C. Difficulty in fitting the fuse into the holder.
- D. Improved circuit efficiency due to lower resistance.

Answer: A

1534. What is the purpose of a ferrule (crimp cap) on the end of a fuse wire?

- A. Enhance electrical conductivity.
- B. Secure the wire connection to the fuse holder.
- C. Act as an additional safety barrier against shock hazards.
- D. Increase the melting point of the fuse element.

Answer: B

1535. What type of fuse is best suited for protecting sensitive electronic equipment due to its fast response and low fault current interruption capability?

- A. High-rupture capacity fuse.
- B. Time-delay fuse.
- C. Semiconductor fuse.
- D. Cartridge fuse.

Answer: C

1536. Which statement accurately describes the relationship between fuse rating and ambient temperature?

- A. The higher the ambient temperature, the lower the safe current rating for the fuse.
- B. Ambient temperature doesn't affect the fuse rating as long as it's within operating limits.
- C. A lower ambient temperature allows for a higher-rated fuse to be used in the circuit.
- D. The current rating of a fuse remains constant regardless of the surrounding temperature.

Answer: A

1537. What potential drawback exists when using high-rupture capacity HRC. fuses?

- A. They are susceptible to damage from vibration and shock.
- B. They require specialized holders due to their larger size.
- C. Their fast-acting nature may not offer sufficient protection for motor circuits.
- D. They are generally less efficient and generate more heat compared to standard fuses.

Answer: B

1538. What is the primary function of a current-limiting fuse in protecting electrical equipment?

- A. To rapidly extinguish the arc formed during overload.
- B. To limit the peak current level during a fault event, minimizing damage.
- C. To provide overload protection with a longer time delay for motor starting surges.
- D. To act as a voltage regulator and stabilize the circuit.

Answer: B

1539. What type of fuse is commonly used in residential and commercial power distribution panels?

- A. Blade fuse.
- B. Bolt-on fuse.
- C. Microfuse.
- D. Cartridge fuse.

Answer: B

1540. What safety precautions should be taken when handling and storing spare fuses?

- A. Ensure they are properly labeled and stored in a cool, dry place.
- B. Test them with a continuity tester before use to verify functionality.
- C. Keep them close to electrical panels for easy access in case of a blown fuse.
- D. Dispose of used fuses immediately to avoid accidental misuse.

Answer: A

1541. How does the cross-sectional area of a fuse element affect its current rating?

- A. A larger area allows for higher current flow before melting.
- B. A smaller area provides faster response times to overcurrents.
- C. The cross-sectional area has no significant impact on the fuse rating.
- D. A larger area increases the overall resistance of the element.

Answer: A

1542. What is the main advantage of using a refill fuse compared to a disposable cartridge fuse?

- A. Easier visual inspection of the element for blown status.
- B. Reduced cost and environmental impact due to reusable components.
- C. Improved safety with enclosed construction and arc quenching mechanisms.
- D. Faster tripping times and higher interrupting rating.

Answer: B

1543. What potential risks are associated with using improper or counterfeit fuses?

- A. Reduced protection against overcurrents and increased fire hazards.
- B. Improved circuit efficiency due to lower resistance.
- C. Enhanced compatibility with different types of fuse holders.
- D. Extended lifespan and greater durability compared to genuine fuses.

Answer: A

1544. What can be used as a temporary alternative to a blown fuse if no appropriate replacement is available immediately?

- A. A higher-rated fuse to prevent future blowouts.
- B. A piece of wire or foil, which is highly dangerous and should be avoided.
- C. A resettable fuse, if compatible with the circuit and current requirements.
- D. Another fuse from a different circuit, even if with different rating.

Answer: B

1545. What is the importance of proper fuse selection and installation in electrical systems?

- A. Ensuring optimal circuit protection against overcurrents and potential damage.
- B. Matching the aesthetic appearance of the fuse holder for design consistency.
- C. Simplifying future replacement by using any readily available fuse.
- D. Reducing the overall cost of the electrical installation by choosing inexpensive fuses.

Answer: A

1546. How does the diameter of a fuse element influence its melting point and current rating?

- A. A larger diameter increases the melting point and current rating.
- B. A smaller diameter offers faster response times but lower current capacity.
- C. The diameter has minimal impact on the element's performance.
- D. A larger diameter reduces the overall resistance of the fuse.

Answer: A

1547. What material property is crucial for maintaining a fast-acting response time in a fuse element?

- A. Low specific heat capacity
- B. High electrical conductivity
- C. Ductility and malleability
- D. Resistance to corrosion

Answer: A

1548. What type of fuse is primarily used for protecting low-voltage circuits in sensitive electronic equipment?

- A. Nano-fuse
- B. Liquid-filled fuse
- C. Time-delay fuse
- D. HRC fuse

Answer: A

1549. What is the primary purpose of sand filling in some cartridge fuses?

- A. To enhance arc quenching capabilities during overload.
- B. To improve heat dissipation from the element.
- C. To provide additional mechanical support for the element.
- D. To increase the voltage rating of the fuse.

Answer: A

1550. What specialized type of fuse is used for protecting high-voltage power transmission lines?

- A. Expulsion fuse
- B. Semiconductor fuse
- C. Blade fuse
- D. Refill fuse

Answer: A

1551. What is the advantage of using a current-limiting fuse with semiconductor technology compared to traditional fuses?

- A. Faster response time and lower peak current during fault events.
- B. Reduced cost and compatibility with existing fuse holders.
- C. Ability to withstand higher voltages and larger fault currents.
- D. Improved arc quenching capabilities and visual indication of blown state.

Answer: A

1552. What type of fuse is recommended for protecting motor circuits due to its ability to handle starting current surges?

- A. Time-lag fuse
- B. Fast-acting fuse
- C. High-rupture capacity fuse
- D. Liquid-filled fuse

Answer: A

1553. What is the primary function of a fuse link in a high-voltage fuse?

- A. To provide mechanical support for the element and connect it to the terminals.
- B. To act as a heat sink and improve the element's cooling efficiency.
- C. To isolate the arc formed during overload and direct it safely away from the fuse body.
- D. To control the voltage drop across the circuit and regulate power flow.

Answer: A

1554. What potential consequences can occur if a fuse is underrated for the circuit it protects?

- A. Increased risk of overheating, fire hazards, and circuit damage.
- B. Improved efficiency and reduced power consumption due to lower resistance.
- C. Faster response time to protect sensitive electronics from overcurrents.
- D. Enhanced arc quenching capabilities and fault current interruption.

Answer: A

1555. What is the importance of properly labeling fuses with their current rating and type?

- A. Ensuring safe and efficient replacement by choosing the appropriate fuse.
- B. Enhancing the aesthetic appearance of the fuse holder and wiring system.
- C. Simplifying circuit troubleshooting by identifying potential fuse-related issues.
- D. Complying with building codes and electrical safety regulations.

Answer: A

1556. How can the ambient temperature surrounding a fuse affect its current rating?

- A. Higher temperatures require a lower current rating for safe operation.
- B. Lower temperatures allow for a higher current rating due to improved heat dissipation.
- C. Ambient temperature has no significant impact on the fuse rating.
- D. Higher temperatures enhance the element's melting point and increase the current capacity.

Answer: A

1557. What factor, apart from current rating, is crucial for choosing the right fuse for a specific application?

- A. Voltage rating of the circuit
- B. Type of wire used in the circuit
- C. Color code of the fuse element
- D. Size and dimensions of the fuse holder

Answer: A

1558. For high-voltage fuses, what material is commonly used due to its excellent insulating properties?

- A. Porcelain
- B. Copper
- C. Aluminum
- D. PVC

Answer: A

1559. Which type of fuse is well-suited for protecting automotive circuits due to its compact size and vibration resistance?

- A. Microfuse
- B. Cartridge fuse
- C. Bolt-on fuse
- D. Time-lag fuse

Answer: A

1560. What potential hazard can occur if a fuse holder is not properly tightened or secured?

- A. Increased risk of arcing and electrical shock due to loose connections.
- B. Faster response time and improved protection against overcurrents.
- C. Enhanced cooling efficiency and lower operating temperature for the fuse.
- D. Reduced voltage drop across the circuit and improved power transmission.

Answer: A

1561. What potential consequences can occur if a fuse is underrated for the circuit it protects?

- A. Increased risk of overheating, fire hazards, and circuit damage due to delayed tripping.
- B. Improved efficiency and reduced power consumption due to lower resistance.
- C. Faster response time to protect sensitive electronics from overcurrents.
- D. Enhanced arc quenching capabilities and safe interruption of even small fault currents.

Answer: A

1562. What is the primary function of a ferrule (crimp cap) on the end of a fuse wire?

- A. Secure the wire connection to the fuse holder.
- B. Enhance electrical conductivity.
- C. Act as an additional safety barrier against shock hazards.
- D. Increase the melting point of the fuse element.

Answer: A

1563. How does the cross-sectional area of a fuse element affect its current rating?

- A. A larger area allows for higher current flow before melting.
- B. A smaller area offers faster response times to overcurrents.
- C. The cross-sectional area has no significant impact on the fuse rating.
- D. A larger area increases the overall resistance of the element.

Answer: A

1564. What is the main advantage of using a refill fuse compared to a disposable cartridge fuse?

- A. Reduced cost and environmental impact due to reusable components.
- B. Easier visual inspection of the element for blown status.
- C. Improved safety with enclosed construction and arc quenching mechanisms.
- D. Faster tripping times and higher interrupting rating.

Answer: A

1565. What potential risks are associated with using improper or counterfeit fuses?

- A. Reduced protection against overcurrents and increased fire hazards.
- B. Improved circuit efficiency due to lower resistance.
- C. Enhanced compatibility with different types of fuse holders.
- D. Extended lifespan and greater durability compared to genuine fuses.

Answer: A

1566. What type of fuse is best suited for protecting power distribution panels in large buildings due to their high current capacity and robust construction?

- A. Bolt-on fuse
- B. Blade fuse
- C. Microfuse
- D. Cartridge fuse

Answer: A

1567. What is the primary purpose of sand filling in some high-voltage fuses?

- A. To improve heat dissipation from the element.
- B. To enhance arc quenching capabilities during overload.
- C. To provide additional mechanical support for the element.
- D. To increase the voltage rating of the fuse.

Answer: B

1568. How does the diameter of a fuse element influence its melting point and current rating?

- A. A larger diameter increases the melting point and current rating.
- B. A smaller diameter offers faster response times but lower current capacity.
- C. The diameter has minimal impact on the element's performance.
- D. A larger diameter reduces the overall resistance of the fuse.

Answer: A

1569. What material property is crucial for maintaining a fast-acting response time in a fuse element?

- A. Low specific heat capacity
- B. High electrical conductivity
- C. Ductility and malleability
- D. Resistance to corrosion

Answer: A

1570. What type of fuse is primarily used for protecting low-voltage circuits in sensitive electronic equipment?

- A. Nano-fuse
- B. Liquid-filled fuse
- C. Time-delay fuse
- D. HRC fuse

Answer: A

1571. What is the advantage of using a current-limiting fuse with semiconductor technology compared to traditional fuses?

- A. Faster response time and lower peak current during fault events.
- B. Reduced cost and compatibility with existing fuse holders.
- C. Ability to withstand higher voltages and larger fault currents.
- D. Improved arc quenching capabilities and visual indication of blown state.

Answer: A

1572. What type of fuse is recommended for protecting motor circuits due to its ability to handle starting current surges?

- A. Time-lag fuse
- B. Fast-acting fuse
- C. High-rupture capacity fuse
- D. Liquid-filled fuse

Answer: A

1573. What is the importance of properly labeling fuses with their current rating and type?

- A. Ensuring safe and efficient replacement by choosing the appropriate fuse.
- B. Enhancing the aesthetic appearance of the fuse holder and wiring system.
- C. Simplifying circuit troubleshooting by identifying potential fuse-related issues.
- D. Complying with building codes and electrical safety regulations.

Answer: A

1574. What potential consequences can occur if a fuse holder is not properly tightened or secured?

- A. Increased risk of arcing and electrical shock due to loose connections.
- B. Faster response time and improved protection against overcurrents.
- C. Enhanced cooling efficiency and lower operating temperature for the fuse.
- D. Reduced voltage drop across the circuit and improved power transmission.

Answer: A

1575. How can the ambient temperature surrounding a fuse affect its current rating?

- A. Higher temperatures require a lower current rating for safe operation.
- B. Lower temperatures allow for a higher current rating due to improved heat dissipation.
- C. Ambient temperature has no significant impact on the fuse rating.
- D. Higher temperatures enhance the element's melting point and increase the current capacity.

Answer: A

1576. What factor, apart from current rating, is crucial for choosing the right fuse for a specific application?

- A. Voltage rating of the circuit
- B. Type of wire used in the circuit
- C. Color code of the fuse element
- D. Size and dimensions of the fuse holder

Answer: A

1577. What material is commonly used in high-voltage fuses due to its excellent insulating properties?

- A. Porcelain
- B. Copper
- C. Aluminum
- D. PVC

Answer: A

1578. Which type of fuse is well-suited for protecting automotive circuits due to its compact size and vibration resistance?

- A. Microfuse
- B. Cartridge fuse
- C. Bolt-on fuse
- D. Time-lag fuse

Answer: A

1579. What is the primary function of a fuse indicator window on a cartridge fuse?

- A. Easier and safer identification of a blown fuse without removing the holder.
- B. Enhanced arc quenching capabilities and reduced fault current interruption.
- C. Improved current rating due to increased heat dissipation.
- D. More accurate measurement of the voltage drop across the circuit.

Answer: A

1580. What potential hazard can occur if a fuse is oversized for the circuit it protects?

- A. Higher risk of overheating, fire hazards, and circuit damage due to delayed tripping.
- B. Increased protection against short circuits and electrical surges.
- C. Faster response time and improved efficiency for sensitive electronic components.
- D. Enhanced arc quenching and safe interruption of even small fault currents.

Answer: A

1581. What type of fuse is primarily used in residential appliance circuits due to its affordability and ease of replacement?

- A. Blade fuse
- B. Microfuse
- C. Cartridge fuse
- D. High-rupture capacity fuse

Answer: A

1582. What characteristic makes a ceramic fuse element suitable for high-voltage applications?

- A. High melting point and excellent heat resistance
- B. Low specific heat capacity and fast response time
- C. Ductility and malleability for easy installation
- D. High electrical conductivity and reduced voltage drop

Answer: A

1583. What safety precautions should be taken when working with high-voltage fuses?

- A. Wear insulated gloves, safety glasses, and follow proper lockout/tagout procedures.
- B. Use a screwdriver or pliers to grip the fuse firmly for better leverage.
- C. Test the fuse with a continuity tester before handling it to verify functionality.
- D. Replace the fuse with one of the same rating and type regardless of the circuit requirements.

Answer: A

1584. Which type of fuse is not recommended for motor circuits due to its fast-acting response time?

- A. Fast-acting fuse
- B. Time-lag fuse
- C. Liquid-filled fuse
- D. Cartridge fuse

Answer: A

1585. How can choosing the right fuse size and type enhance the operational efficiency of a circuit?

- A. Minimizes heat generation and power losses, improving overall energy efficiency.
- B. Allows for higher operating temperatures, leading to increased circuit capacity.
- C. Simplifies circuit troubleshooting and maintenance procedures.
- D. Provides additional aesthetic appeal due to the variety of fuse designs available.

Answer: A

1586. What type of fuse is recommended for protecting sensitive electronic circuits due to its low breaking capacity and precise tripping characteristics?

- A. Semiconductor fuse
- B. Liquid-filled fuse
- C. High-rupture capacity fuse
- D. Cartridge fuse

Answer: A

1587. What factor is not considered when assigning a color code to a fuse?

- A. Current rating of the fuse.
- B. Type of fuse element (e.g., copper, silver)
- C. Voltage rating of the fuse
- D. Intended application (e.g., motor circuit, electronics)

Answer: A

1588. What potential consequence can occur if a time-lag fuse is used in a circuit not designed for its delayed tripping characteristic?

- A. Increased risk of overheating, fire hazards, and circuit damage due to delayed response to overcurrents.
- B. Enhanced arc quenching capabilities and safe interruption of high-energy faults.
- C. Improved efficiency for circuits with frequent starting current surges.
- D. Faster response time and better protection for sensitive electronic components.

Answer: A

1589. What maintenance practice is recommended for ensuring safe and reliable operation of high-voltage fuses?

- A. Regular visual inspection for signs of damage, cracks, or loose connections.
- B. Testing the fuse with a continuity tester to verify its functionality at regular intervals.
- C. Replacing the fuse at pre-determined intervals regardless of its condition.
- D. Leaving the fuse untouched unless a fault occurs in the circuit.

Answer: A

1590. What advantage does a liquid-filled fuse offer compared to a traditional cartridge fuse?

- A. Improved heat dissipation and faster response time due to liquid convection.
- B. Enhanced arc quenching capabilities due to the enclosed liquid chamber.
- C. Increased voltage rating and suitability for high-voltage applications.
- D. Reduced cost and ease of replacement compared to more complex designs.

Answer: A

1591. What characteristic makes a high-rupture capacity (HRC) fuse suitable for protecting large industrial equipment?

- A. Ability to safely interrupt high-energy fault currents due to robust construction.
- B. Low current rating and fast response time for sensitive electronic circuits.
- C. Compact size and ease of installation in small spaces.
- D. Visual indicator window for easy identification of a blown fuse.

Answer: A

1592. How does the construction of a time-lag fuse element differ from a fast-acting fuse element?

- A. Time-lag elements have additional thermal mass or specific heating elements to create a delay.
- B. They are made from different materials with varying melting points and thermal conductivities.
- C. Time-lag elements are physically larger than fast-acting ones.
- D. Their construction has minimal impact on the tripping characteristics.

Answer: A

1593. What potential benefit can be obtained by using a resettable fuse compared to a traditional fuse?

- A. Increased sustainability and reduced waste due to reusability.
- B. Faster response time and enhanced arc quenching capabilities.
- C. Improved compatibility with existing fuse holders and circuits.
- D. Higher current rating and suitability for heavy-duty applications.

Answer: A

1594. What safety precautions should be taken when replacing a blown fuse?

- A. Turn off the power source, wear proper safety gear, and follow lockout/tagout procedures.
- B. Use a screwdriver or pliers to grip the fuse firmly for better leverage.
- C. Test the new fuse with a continuity tester before installing it.
- D. Replace the fuse with one of the same size and color regardless of the circuit requirements.

Answer: A

1595. What is the primary function of a fuse link in a low-voltage cartridge fuse?

- A. Provide mechanical support for the element and connect it to the terminals.
- B. Act as a heat sink and improve the element's cooling efficiency.
- C. Isolate the arc formed during overload and direct it safely away from the fuse body.
- D. Control the voltage drop across the circuit and regulate power flow.

Answer: A

1596. What type of fuse is recommended for protecting circuits in hazardous environments due to its spark-resistant design?

- A. Intrinsic safety fuse
- B. Time-lag fuse
- C. High-rupture capacity fuse
- D. Liquid-filled fuse

Answer: A

1597. What potential benefit can be gained by using a visual indicator window on a high-voltage fuse compared to a solid body design?

- A. Easier and safer identification of a blown fuse without removing the holder.
- B. Enhanced arc quenching capabilities due to increased ventilation.
- C. Improved current rating and ability to handle higher loads.
- D. Reduced cost and simplified fuse replacement procedures.

Answer: A

1598. How can selecting the appropriate fuse holder material impact the safety and performance of the circuit?

- A. Choosing a material with suitable insulating properties and heat resistance can prevent electrical hazards and overheating.
- B. A larger holder size allows for easier installation and handling of the fuse.
- C. Matching the holder's material to the type of fuse element has minimal impact on performance.
- D. Any type of holder will suffice as long as it physically accommodates the fuse.

Answer: A

1599. What potential consequence can occur if a fuse is used in a circuit exceeding its voltage rating?

- A. Increased risk of electrical breakdown and arcing due to exceeding the insulation limits.
- B. Faster response time and improved protection against overcurrents.
- C. Enhanced arc quenching capabilities and safe interruption of high-energy faults.
- D. Improved heat dissipation and extended lifespan of the fuse element.

Answer: A

1600. How does the cross-sectional area of a fuse wire affect its melting point and current rating?

- A. A larger area increases the melting point and allows for a higher current rating.
- B. A smaller area offers faster response times but lower current capacity.
- C. The cross-sectional area has minimal impact on the element's performance.
- D. A larger area reduces the overall resistance of the wire.

Answer: A

1601. What potential consequence can occur if a fuse holder is corroded or damaged?

- A. Increased risk of arcing and electrical hazards due to poor connections.
- B. Improved heat dissipation and longer lifespan of the fuse element.
- C. Enhanced arc quenching capabilities and safe interruption of fault currents.
- D. Faster response time and improved protection against overcurrents.

Answer: A

1602. What is the advantage of using a refill fuse compared to a disposable cartridge fuse?

- A. Reduced cost and environmental impact due to reusable components.
- B. Easier visual inspection of the element for blown status.
- C. Improved safety with enclosed construction and arc quenching mechanisms.
- D. Faster tripping times and higher interrupting rating.

Answer: A

1603. What potential risks are associated with using improper or counterfeit fuses?

- A. Improved circuit efficiency due to lower resistance.
- B. Reduced protection against overcurrents and increased fire hazards.
- C. Enhanced compatibility with different types of fuse holders.
- D. Extended lifespan and greater durability compared to genuine fuses.

Answer: B

1604. What type of fuse is primarily used for protecting power distribution panels in large buildings due to their high current capacity and robust construction?

- A. Microfuse
- B. Blade fuse
- C. Bolt-on fuse
- D. Cartridge fuse

Answer: C

1605. How can improper selection or installation of a fuse impact the performance and safety of a circuit?

- A. Using an incorrect fuse rating or exceeding its voltage limit can lead to overheating, fire hazards, and electrical breakdown.
- B. A slightly larger fuse size may offer increased protection without negatively affecting the circuit.
- C. Incorrect installation methods like loose connections have minimal impact on fuse performance.
- D. Installing a fuse in the wrong orientation disrupts circuit flow but poses no safety risks.

Answer: A

1606. What is the primary purpose of sand filling in some high-voltage fuses?

- A. To improve heat dissipation from the element.
- B. To enhance arc quenching capabilities during overload and suppress potential arcs.
- C. To provide additional mechanical support for the element.
- D. To increase the voltage rating of the fuse.

Answer: B

1607. What characteristic makes a ceramic fuse element suitable for high-voltage applications?

- A. Low specific heat capacity and fast response time
- B. Ductility and malleability for easy installation
- C. High electrical conductivity and reduced voltage drop
- D. High melting point and excellent heat resistance

Answer: D

1608. What potential consequence can occur if a time-lag fuse is used in a circuit not designed for its delayed tripping characteristic?

- A. Enhanced arc quenching capabilities and safe interruption of high-energy faults.
- B. Improved efficiency for circuits with frequent starting current surges.
- C. Increased risk of overheating, fire hazards, and circuit damage due to delayed response to overcurrents.
- D. Faster response time and better protection for sensitive electronic components.

Answer: C

1609. What type of fuse is not recommended for motor circuits due to its fast-acting response time?

- A. Fast-acting fuse
- B. Time-lag fuse
- C. Liquid-filled fuse
- D. Cartridge fuse

Answer: A

1610. What potential benefits can be obtained by choosing a high-rupture capacity (HRC) fuse for industrial applications?

- A. Enhanced efficiency and lower heat generation in circuits.
- B. Reduced cost and wider compatibility with different fuse holders.
- C. Faster response time and improved protection for sensitive electronic components.
- D. Safe interruption of high-energy fault currents due to robust construction and arc quenching mechanisms.

Answer: D

1611. How can using a resettable fuse benefit the environment compared to traditional disposable fuses?

- A. Enhanced arc quenching capabilities and improved safety during fuse replacement.
- B. Simpler installation and compatibility with existing fuse holders.
- C. Reduced waste and environmental impact due to reusability.
- D. Faster response time and better protection against overcurrents.

Answer: C

1612. What safety precautions should be taken when testing a fuse with a continuity tester?

- A. Grip the fuse firmly with your bare hands for improved conductivity.
- B. Use the tester while the fuse is installed in the circuit for a more accurate reading.
- C. Ensure the circuit is de-energized and follow lockout/tagout procedures before any testing.
- D. Replace the fuse immediately if the continuity tester indicates a fault.

Answer: C

1613. What information is typically found on the marking of a cartridge fuse?

- A. Circuit diagram and recommended replacement procedures.
- B. Current rating, voltage rating, type of element, and manufacturer's logo.
- C. Serial number and date of production for traceability.
- D. Expiry date and instructions for safe disposal.

Answer: B

1614. What type of fuse is primarily used in residential appliance circuits due to its affordability and ease of replacement?

- A. Microfuse
- B. Cartridge fuse
- C. Blade fuse
- D. Bolt-on fuse

Answer: C

1615. What are the objectives of earthing?

- A. It provides a path for discharging and de-energizing equipment to carry out maintenance on the equipment
- B. protection of human and animals life by controlling touch and step voltage to safer values
- C. It is used to provide zero potential surface
- D. all of the above

Ans.: D

1616. The process of connecting the metallic frame of electrical equipment or some electrical part of the system to earth is called ____.

- A. Grounding or earthing
- B. earth resistance
- C. resistance of the earth electrode
- D. any of the above

Ans.: A

1617. The resistance of earth should be ____.

- A. low
- B. high
- C. the minimum possible
- D. infinite

Ans.: C

1618. The safety of electrical equipment and wiring is ensured by which of the following?

- A. earthing
- B. providing a fuse
- C. insulation
- D. All of the above

Ans.: D

1619. When moisture falls below _____, resistivity of earth increase sharply.

- A. 20%
- B. 40%
- C. 50%
- D. 10%

Ans.: A

1620. Earth electrodes can be in the form of _____.

- A. pipe, plate
- B. strip
- C. wire
- D. all of the above

Ans.: D

1621. Earthing is necessary to give protection against _____.

- A. Electric shock
- B. voltage fluctuation
- C. over loading
- D. none of the above

Ans.: A

1622. The earth wire should not be size than

- A. 20 SWG
- B. 10 SWG
- C. 25 SWG
- D. 5 SWG

Ans.: B

1623. The earth wire should be of _____.

- A. mechanically strong
- B. good conductor of electricity
- C. mechanically strong
- D. A and B

Ans.: D

1624. On what basis the size of the earth wire is determine?

- A. current carrying capacity of line
- B. voltage of the service line
- C. Symmetrical fault
- D. any of the above

Ans.: A

1625. For domestic wiring, the minimum size of wire should be not less than

- A. 10 SWG
- B. 14SWG
- C. 20SWG
- D. 25 SWG

Ans.: B

1626. Earth wire is made up of__.

- A. Copper
- B. Aluminium
- C. Galvanized steel
- D. Silver

Ans.: C

1627. The earth potential is taken as ____.

- A. high
- B. low
- C. infinite
- D. zero

Ans.: D

1628. _____ site will be preferred for earthing.

- A. dry and rocky
- B. damp and wet sand pit
- C. clayey soil
- D. wet mashy ground

Ans.: D

1629. which of the following is least preferred for earthing?

- A. earth mixed with salt and charcoal
- B. dry earth
- C. clayey soil
- D. all of the above

Ans.: B

1630. The minimum current a human can feel is approximately equal to ____.

- A. 5 mA
- B. 1 mA
- C. 10 mA
- D. 15 mA

Ans.: B

1631. The perception of electric shock can be depends on the ____.

- A. magnitude of the voltage, frequency
- B. duration of flow of current
- C. current, path taken
- D. All of the above

Ans.: D

1632. The effect of an electric shock is/are ____.

- A. cause death
- B. skin burns
- C. Neurological effect
- D. All of the above

Ans.: D

1633. Death caused by an electric shock is known as ____.

- A. Neurological effect
- B. Electrocution
- C. Ash-flash hazards
- D. none of the above

Ans.: B

1634. ____ can occur if a human's body comes in contact with any source of voltage enough high to force a sufficient current through the body.

- A. electric hazards
- B. electric shock
- C. Earthing
- D. None of the above

Ans.: B

1635. The resistance of the earth should be maintained __ for domestic installation.

- A. 1 Ohm
- B. 3 Ohm
- C. 5 Ohm
- D. 10 Ohm

Ans.: C

1636. Q.22 ____ color of wire is used for earthing.

- A. Red
- B. Blue
- C. Black
- D. Green

Ans.: D

1637. Disadvantages of earthing.

- A. Very expensive due to the provision of a complete system of protective conductors, earth electrodes etc.
- B. Possible safety hazard
- C. Both A and B
- D. none of the above

Ans.: C

1638. A conductor which connects a part of an electrical installation, exposed conductive part to a earth electrode is known as ____.

- A. Earthing conductor
- B. Earthing plate
- C. Earth electrode
- D. any of the above

Ans.: A

1639. ____ is the voltage occurring between the earthing system and reference earth at a given value of earth current flowing through earthing system.

- A. Earth electrode
- B. Earth voltage or earth potential
- C. Earth resistivity
- D. None of the above

Ans.: B

1640. Earth surface potential is the voltage between a point x on the earth's surface and ____.

- A. Earth resistance
- B. Earth potential
- C. Reference earth
- D. any of the above

Ans.: C

1641. ____ is the resistance, measured between two opposite faces.

- A. Earth potential
- B. Earth resistance
- C. Earth resistivity or specific earth resistance
- D. all of the above

Ans.: C

1642. If moisture of earth is increases then earth resistance is ____.

- A. Decrease
- B. Increases
- C. cannot changes
- D. none of the above

Ans.: D

1643. While designing Ground resistance which of the following is considered?

- A. Ground resistance should be as high as possible
- B. Ground resistance should be as low as possible
- C. ground resistance should be zero
- D. none of the above

Ans.: B

1644. Average resistance of human

- A. 1000 Ohms
- B. 5000 ohms
- C. 10 ohms
- D. 100 ohms

Ans.: A

1645. What is earth current?

- A. The current dissipated by the earth electrode into the ground
- B. the current at time of earth fault
- C. the current at which the protective system operated
- D. all of the above

Ans.: A

1646. The current range of 1.6 mA, do not impair the person ability. It is also known as ____.

- A. Fault current
- B. Let go current
- C. normal current
- D. none of the above

Ans.: B

1647. The body can tolerate _____ direct current than alternating current at 50 Hz.

- A. lower
- B. same
- C. higher
- D. can't decide

Ans.: C

1648. The current higher than ____ , dangerous for human body.

- A. 10 mA
- B. 20 mA
- C. 100 mA
- D. 60 mA

Ans.: D

1649. The current range of ____ , may be painful and affect person ability.

- A. 10-15 mA
- B. 9-25 mA
- C. 50-60 mA
- D. 100-150 mA

Ans.: B

1650. The permissible current and duration should be less than that required for ventricular fibrillation of the heart and is calculated by the following equation for up to 3 sec. (Person of 50 kg)

- A. $I_B = 0.116/\sqrt{t}$
- B. $I_B = 1.16/\sqrt{t}$
- C. $I_B = 116/\sqrt{t}$
- D. $I_B = 11.6/\sqrt{t}$

Ans.: A

1651. The lower the resistivity ____ the earthing resistance.

- A. higher
- B. lower
- C. cannot change
- D. none of the above

Ans.: B

1652. Earthing of more than one point is used in ____ and higher voltage system.

- A. 32 kV
- B. 66 kV
- C. 220 kV
- D. 132 kV

Ans.: C

1653. A coil type electrode, a coil of GI wire of ____ size is made.

- A. 5 SWG
- B. 14 SWG
- C. 15 SWG
- D. 8 SWG

Ans.: D

1654. Resistivity of concrete becomes approximately equal to _____ Ωcm at 20°C under the ground which is less than the average earth resistivity.

- A. 5000
- B. 1000
- C. 3000
- D. 2500

Ans.: C

1655. Cross section area of the earthing lead should not be _____ of the main conductor.

- A. more than
- B. less than half
- C. equal
- D. none of the above

Ans.: B

1656. The earth conductor which connects the main switch board to the distribution board is called as _____.

- A. main earthing conductor
- B. sub earthing conductor
- C. Earthing leads
- D. any of the above

Ans.: B

1657. The earth wire which is run from the distribution board to different switch boards is called as the _____.

- A. Earth electrode
- B. main earthing conductor
- C. Earth continuity conductor
- D. all of the above

Ans.: C

1658. The size of the earth continuity conductor should not be less than ____.

- A. 14 SWG (2.894 mm²)
- B. 28 SWG
- C. 15 SWG
- D. 8 SWG

Ans.: A

1659. The maximum permissible value of earth resistance for small substation is ____.

- A. 5 ohms
- B. 10 ohms
- C. 20 ohms
- D. 100 ohms

Ans.: A

1660. In plate earthing, the size of copper plate _____ is used.

- A. 300 mm x 300 mm x 3 mm
- B. 100 mm x 100 mm x 1 mm
- C. 600 mm x 600 mm x 3 mm
- D. 200 mm x 200 mm x 2 mm

Ans.: C

1661. In plate earthing, the size of Aluminium plate _____ is used.

- A. 600 mm x 600 mm x 6 mm
- B. 200 mm x 200 mm x 2 mm
- C. 600 mm x 600 mm x 3 mm
- D. 600 mm x 600 mm x 30 mm

Ans.: A

1662. In plate earthing, the plate is buried vertically in the ground at the depth of ____.

- A. not less than 1.5m
- B. not less than 3m
- C. not less than 1m
- D. not less than 0.5m

Ans.: B

1663. Alternate layer of _____ and _____ each 150 cm thick are kept around plate of the plate earthing method.

- A. charcoal, soil
- B. charcoal, concrete
- C. charcoal, salt
- D. any of the above

Ans.: C

1664. In plate earthing, four to five bucket of water is poured at the regular of few days. This is because of ____.

- A. to increase earth resistance
- B. to reduced earth resistance
- C. to increase earth potential
- D. to decrease earth potential

Ans.: B

1665. The plate earthing system is employed for the _____ and the _____ where there is possibility of more fault.

- A. generator, substation
- B. substation, transmission line
- C. transmission line, big power stations
- D. transmission line, small power station

Ans.: D

1666. In pipe earthing, _____ pipe is used.

- A. galvanized iron
- B. aluminium
- C. iron
- D. any of the above

Ans.: A

1667. The size of the galvanized iron pipe used in pipe earthing methods.

- A. 25 mm diameter and 1 to 1.5 m long
- B. 38 mm diameter and 2 to 2.5 m long
- C. 10 mm diameter and 1 to 2 m long
- D. 50 mm diameter and 2 to 2.5 m long

Ans.: B

1668. A pit of size _____ made of concrete and 12.5 cm thick is constructed above the end of pipe in pipe earthing method.

- A. 30 mm x 30 mm x 30 mm
- B. 40 mm x 40 mm x 40 mm
- C. 50 mm x 50 mm x 50 mm
- D. any of the above

Ans.: A

1669. A pipe earthing method of earthing is employed in _____ and _____ where there is possibility of comparatively small fault current.

- A. large power station, small sub station
- B. small power stations, sub stations
- C. transmission line, large power station
- D. Generating station, large power station

Ans.: B

1670. Small holes of _____ diameter are drilled at the spacing of ____ in pipe earthing.

- A. 10mm, 10 cm
- B. 12 mm, 12 mm
- C. 12 mm, 15cm
- D. 12cm, 15mm

Ans.: C

1671. Plate and pipe earthing are used where the soil is ____.

- A. comparatively soft
- B. soil may be sandy
- C. rocky
- D. any of the above

Ans.: A

1672. In coil earthing method, alternate layer of charcoal and salt each ____ thick are provided around the coil.

- A. 150mm
- B. 300mm
- C. 450mm
- D. 600mm

Ans.: B

1673. Coil earthing is employed for the earthing of the ____.

- A. distribution substation
- B. Intermediate substation
- C. Transmission line
- D. distribution poles

Ans.: D

1674. Special earthing methods are employed for land is like sandy, rock ect.

- A. method of earthing in sandy bed
- B. method of earthing in rocky bed
- C. method of earthing of extra high voltage system
- D. all of the above

Ans.: D

1675. Plate earthing and pipe earthing are used where the soil is ____.

- A. Comparatively rocky
- B. Comparatively soft
- C. comparatively sandy
- D. all of the above

Ans.: B

- 1676. The value of the earth resistance decreases as the electrodes are connected in ____.**
- A. series
 - B. parallel
 - C. series-parallel
 - D. none of the above

Ans.: B

- 1677. The value of earth resistance is _____ to the square of the distance.**
- A. directly proportional
 - B. inversely proportional
 - C. not defined
 - D. none of the above

Ans.: B

- 1678. As the distance from the electrode increase, the earth resistance ____**
- A. increases
 - B. decrease
 - C. cannot change
 - D. none of the above

Ans.: B

- 1679. Earth resistance should be _____ when the capacity of the equipment is ____.**
- A. more, more
 - B. less, less
 - C. more, less
 - D. less, more

Ans.: D

- 1680. Which of the following is correct as the maximum permissible earthing resistance for different installation as per Indian electricity rules.**
- A. small substation = 2.00 ohms
 - B. Domestic installation = 8.00 ohms
 - C. big power station or substation = 1.00 ohms
 - D. all of the above

Ans.: D

- 1681. Which of the following factors increase the earth resistance?**
- A. reduced amount of moisture in soil
 - B. rust between joints
 - C. loose connections
 - D. all of the above

Ans.: D

1682. Less contact is made when the connection is loose so the ____.

- A. resistance decreases
- B. moisture increases
- C. resistance increases
- D. Temperature of the contact increases

Ans.: C

1683. Rust is developed at the joint due to ____.

- A. the moisture in the atmosphere
- B. if the plate or rod buried in earth
- C. due to loose contact
- D. Both A and B

Ans.: D

1684. The earth resistance in summer season as compared to monsoon season is ____.

- A. more
- B. less
- C. equal in both the season
- D. Cant defined

Ans.: A

1685. which of the following methods are used to measure the earth resistance?

- A. Voltmeter-ammeter method
- B. Earth loop tester and earth tester method
- C. ohm meter method
- D. all of the above

Ans.: D

1686. Earth tester is an instrument to measure ____.

- A. high resistance
- B. low resistance
- C. medium resistance
- D. extra high resistance

Ans.: B

1687. ____ is used to measure earth loop resistance between the substation and place of use.

- A. voltmeter-ammeter method
- B. Ohms meter method
- C. Loop tester method
- D. none of the above

Ans.: C

1688. Many times static electric charges are produced due to friction between the two rotating parts which produces potential difference between these two parts. These two are joined by a flexible conductor is called as ____.

- A. Grounding
- B. welding
- C. bonding
- D. soldering

Ans.: C

1689. Earthing of the following parts should be done in substation and generating station:

- A. Metal framework not related to power system such as steel structure
- B. Equipments related to each system such as framework, non conducting parts
- C. Neutral point of systems of different voltages
- D. all of the above

Ans.: D

1690. _____ and _____ mechanism should be earthed through separate branch.

- A. Circuit breaker, earth switch
- B. Isolators, circuit breaker
- C. Isolators, earth switch
- D. Relay, earth switch

Ans.: C

1691. The poles of the transmission line are kept in ground their earthing is automatically done, even though a separate earthing has to be made when the ____.

- A. soil has less resistivity
- B. soil has more resistivity
- C. Soil has high conductivity
- D. none of the above

Ans.: B

1692. Earth wire of the overhead line should be earthed at every _____ distance by preparing independent earth pit.

- A. 10 km
- B. 5.5 km
- C. 6.5 km
- D. 15 km

Ans.: C

1693. Earth wire of the over head line gives protection against ____ also.

- A. Earth fault
- B. line to line fault
- C. breakdown of conductor
- D. lightening

Ans.: D

1694. Earthing of neutral in power system can be provided by which of the following?

- A. solid earthing and transformer earthing
- B. resistance and reactance earthing
- C. Peterson coil or suppression coil earthing
- D. all of the above

Ans.: D

1695. Solid earthing system is employed up to ____.

- A. 11 kV
- B. 33 kV
- C. 66 kV
- D. 132 kV

Ans.: B

1696. The resistance earthing method is used for the system having voltages of ____ and the capacity of power source is more than ____.

- A. 2.2 kV to 33 kV, 5 MVA
- B. 22 kV to 33 kV, 10 MVA
- C. 33 kV to 66 kV, 5 MVA
- D. 132 kV to 400 kV, 500 MVA

Ans.: A

1697. Reactance earthing method can be employed where the value of the _____ is more.

- A. Fault current
- B. Charging current
- C. Earth fault current
- D. leakage current

Ans.: B

1698. In ____ type earthing system the other healthy phases can supply power when a ground fault occurs on one phase.

- A. reactance earthing
- B. Resistance earthing
- C. Peterson coil
- D. any of the above

Ans.: C

1699. Peterson coil is also called as ____.

- A. Arc suppression coil
- B. ground fault neutralizer
- C. Both A and B
- D. None of the above

Ans.: C

1700. The grounding obtain by Peterson coil is called as ____.

- A. resonant grounding
- B. neutral grounding
- C. system grounding
- D. all of the above

Ans.: A

1701. In which type of earthing system tapings are provided so if there is change in the length of the line or in the capacitance of the line, the value of inductance can be adjusted with the help of tapping?

- A. reactance earthing method
- B. Resistance earthing method
- C. Peterson or arc suppression method
- D. Solid earthing method

Ans.: C

1702. Neutral is not available when system is ____.

- A. star connected
- B. delta connected
- C. star-delta
- D. none of the above

Ans.: B

1703. IF we double the radius of an electrode, the resistance would decreases only by ____.

- A. 20 %
- B. 30 %
- C. 10 %
- D. 25 %

Ans.: C

1704. Which of the following is/are correct regarding soil resistivity?

- A. Rock = 1000- 1000 ohm-m
- B. Ice = 10000 – 100000 ohm-m
- C. Sea water = 0.1 – 10 ohm-m
- D. all of the above

Ans.: D

1705. soil resistivity is expressed in ____.

- A. Ohm-meter
- B. Ohm/ meter
- C. Ohm
- D. meter/ohm

Ans.: A

- 1706. The two main factors which influence the soil resistivity value are the ____ and ____.**
- A. porosity of the material
 - B. the water content
 - C. type of electrodes
 - D. Both A and B

Ans.: D

- 1707. The ____ and ____ have an important influence on the soil resistivity and hence on the performance of earthing system.**

- A. Temperature
- B. Water content
- C. Both A and B
- D. none of the above

Ans.: C

- 1708. Why it is necessary to install the electrodes beneath the freezing line?**

- A. Ice has very high resistivity as compared to water
- B. Ice has very low resistivity as compared to water
- C. Ice and water are same resistivity
- D. Any of the above

Ans.: A

- 1709. The water content varies with seasonally and likely to cause variation in the ____.**

- A. Temperature of earth
- B. Electrode conductivity
- C. resistance of earthing system
- D. all of the above

Ans.: C

- 1710. Which of the following is/are correct formula for calculation of soil resistivity?**

- A. $\rho = \pi AR$
- B. $\rho = 2AR$
- C. $\rho = 2\pi R$
- D. $\rho = 2\pi AR$

[ρ = average soil resistivity in ohm-cm, A= distance between the electrode, R= the measured resistance value in ohm]

Ans.: D

1711. _____ in the water further reduced the resistivity of earthing particular where there are naturally occurring and do not dilute with time.

- A. Dissolve minerals
- B. salt
- C. Both A and B
- D. None of the above

Ans.: C

1712. If the working voltage of the transmission line is very high, the magnitude of earth fault current is also ____.

- A. very low
- B. very high
- C. depend on soil
- D. all of the above

Ans.: B

1713. The size of the conductor must be chosen in such a way that it can withstand the _____ produced by earth fault current until the protective relay comes into action and isolates the faulty portion of the system.

- A. high resistance
- B. high earth fault current
- C. high temperature
- D. high voltage

Ans.: C

1714. Which of the following is correct for the minimum cross sectional area of the earth conductor?

- A. $A = I_{\text{fault}}/C \text{ mm}^2$
- B. $A = I_{\text{fault}}\sqrt{t} \text{ mm}^2$
- C. $A = \sqrt{t}/C \text{ mm}^2$
- D. $A = I_{\text{fault}}\sqrt{t}/C \text{ mm}^2$

Ans.: D

[A = minimum area of conductor required, t = time in second which is required for the operation of the C.B, C = constant whose value depends upon the nature of material]

1715. The melting point of aluminium is _____ than copper.

- A. higher
- B. less
- C. equal
- D. none of the above

Ans.: B

1716. The ____ is defined as the potential difference between two steps of a person standing on the ground with feet apart during the flow of earth fault current.

- A. Earth resistivity
- B. Earth resistance
- C. Electrode resistance
- D. Step potential

Ans.: D

1717. ____ consists of large number of rods which are connected through the copper conductor.

- A. Earthing mat
- B. Earthing wire/ conductor
- C. Earthing electrode
- D. All of the above

Ans.: A

1718. The material used for the grounding conductor should have ____ and ____.

- A. low conductivity, low underground corrosion
- B. high conductivity, high underground corrosion
- C. high conductivity, low underground corrosion
- D. low conductivity, high underground corrosion

Ans.: C

1719. The modern trend is towards the use of ____ in place of copper for the material use for grounding.

- A. steel
- B. Aluminium
- C. tungsten
- D. all of the above

Ans.: A

1720. Which of the following information is necessary to obtain for design of substation earthing grid for substation?

- A. maximum earth fault current, fault clearing time
- B. Area covered by the substation
- C. Resistivity of the soil at the sub-station site
- D. All of the above

Ans.: D

1721. The degree of protection provided by a grounding system under lightning discharge conditions depends upon its _____ rather than on power frequency impedance.

- A. Resistance
- B. impulse impedance
- C. reactance
- D. all of the above

Ans.: B

1722. What is impulse impedance?

- A. The impedance under normal conditions
- B. The impedance under impulse conditions
- C. The impulse under transient conditions
- D. All of the above

Ans.: B

1723. The impulse impedance is always _____ than its power frequency impedance.

- A. lower
- B. higher
- C. equal
- D. any of the above

Ans.: B

1724. Resistivity of water depends on the _____ and _____ of salt dissolved in it.

- A. amount, nature
- B. temperature, nature
- C. purity, nature
- D. none of the above

Ans.: A

1725. Pure water is poor conductor of _____.

- A. temperature
- B. sound
- C. electricity
- D. all of the above

Ans.: C

1726. Which of the following is/are correct for effect of current flowing through human body?

- A. Below 1 mA = nothing
- B. 11 to 25 mA = painful shock with muscle contraction after medical treatment they can restore
- C. Above 150 mA = cardiac arrest, body starts burning resulting into death
- D. All of the above

Ans.: D

1727. Current flows from earthing grid during ____ creating potential difference.

- A. operation and working
- B. faults
- C. lighting
- D. all of the above

Ans.: D

1728. Impulse performance of earthing system depends on which of the following factors?

- A. Electrical soil properties
- B. ground electrode geometry
- C. current waveform properties
- D. all of the above

Ans.: D

1729. Tower footing resistance should be below ____.

- A. 10 Ω
- B. 50 Ω
- C. 40 Ω
- D. 20 Ω

Ans.: A

1730. Material used for tower footing can be ____.

- A. iron clad
- B. copper plates
- C. Both A and B
- D. tungsten

Ans.: C

1731. ____ is very good in improving or increasing the conductivity of soil as compared to others.

- A. Sea water
- B. pure water
- C. Common salt
- D. Drinking water

Ans.: C

1732. A human body can tolerate a current slightly higher than ____.

- A. 10 Hz
- B. 5 Hz
- C. 15 Hz
- D. 25 Hz

Ans.: D

1733. If the depth of the earth electrode increases, the value of ground resistance can be ____.

- A. increases
- B. minimized
- C. does not depend on the depth of electrode
- D. none of the above

Ans.: B

1734. Which of the following common paths for current to flow through the body?

- A. Hand to foot
- B. Hand to hand through the chest
- C. Foot to foot
- D. all of the above

Ans.: D

IV. MEASUREMENTS AND MEASURING INSTRUMENTS

1735. A voltmeter has a uniform scale with 100 divisions. The full-scale reading is 10 V and could be read upto 1/10 of a scale division with some degree of certainty. It's resolution is

- (a) 0.1 V
- (b) 0.02 V
- (c) 0.01 V
- (d) 0.001 V

Ans: (c)

1736. Three DC voltmeters are connected in series across a 120 V DC supply. The Voltmeters are specified as follows. Voltmeter A: 100V, 5mA, Voltmeter B: 100V, 250 Ω /Volt, Voltmeter C: 10mA, 15 k Ω . The voltage read by the meter A, B, and C are respectively.

- (a) 40, 50 and 30
- (b) 40, 40 and 40
- (c) 60, 30 and 30
- (d) 30, 60 and 30

Ans: (a)

1737. If the DC voltmeter is made from an ammeter having a full-scale deflection of 100 μ A, then its sensitivity in (k Ω /V) will be

- (a) 1
- (b) 10
- (c) 100
- (d) 1000

Ans: (b)

1738. The difference between the indicated value and true value of quantity is known as

- (a) Gross error
- (b) Absolute error
- (c) Dynamic error
- (d) Relative error

Ans: (b)

1739. Loading effect is primarily caused by instruments having

- (a) High resistance
- (b) High sensitivity
- (c) Low sensitivity
- (d) High range

Ans: (c)

1740. When reading is taken at half scale in the instrument, the error is

- (a) Exactly equal to half of full-scale error
- (b) Equal to full-scale error
- (c) Less than full-scale error
- (d) More than full-scale error

Ans: (d)

1741. The energy capacity of a storage battery is rated in

- (a) kWh
- (b) kW
- (c) Ampere hours
- (d) Joules

Ans: (c)

1742. Torque/weight ratio of an instrument indicates

- (a) Selectivity
- (b) Accuracy
- (c) Fidelity
- (d) Sensitivity

Ans: (d)

1743. A 100 mA meter has accuracy of $\pm 2\%$. Its accuracy while reading 50 mA will be:

- (a) $\pm 1\%$
- (b) $\pm 2\%$
- (c) $\pm 4\%$
- (d) $\pm 20\%$

Ans: c

1744. A precision current shunt is measuring 200 mV across it and also indicates a current of 30A. What is the actual resistance of this shunt?

- (a) 0.006Ω
- (b) 0.30Ω
- (c) 30Ω
- (d) 6Ω

Ans: (a)

1745. Which of the following is likely to have the largest resistance?

- (a) Moving coil Galvanometer
- (b) Voltmeter of range 10V
- (c) Ammeter of range 1A
- (d) A copper wire of length 1m and 3mm diameter

Ans: (b)

1746. A 0-10A ammeter has a guaranteed accuracy of 1% of full scale deflection, the limiting error while reading 2.5A will be

- (a) 1%
- (b) 2%
- (c) 4%
- (d) None of these

Ans: (c)

1747. Perfect reproducibility means the instrument has

- (a) Zero drift
- (b) High accuracy
- (c) Maximum drift
- (d) Minimum accuracy

Ans: (a)

1748. To reduce the loading effect, an instrument must possess:

- (a) Zero input impedance
- (b) Unit input impedance
- (c) High input impedance
- (d) Low input impedance

Ans: (c)

1749. works on the chemical effect of current.

- (a) Power factor meter
- (b) Voltmeter
- (c) DC ampere hour meter
- (d) Wattmeter

Ans: (c)

1750. Which of the following scale offers widest range for measurement through an instrument?

- (a) Logarithmic Scale
- (b) Exponential Scale
- (c) Linear Scale
- (d) Square-law Scale

Ans: (a)

1751. Which of the following comes under the category of systematic errors in instruments?

- (a) Blunders
- (b) Gross errors
- (c) Random errors
- (d) Instrumental errors

Ans: (d)

1752. The permanent magnet moving coil type instruments are best suited for

- (a) A.C Measurement
- (b) D.C Measurement
- (c) A.C/D.C Measurement
- (d) Frequency measurement

Ans: (b)

1753. A meter reads 127.50 V and the true value of the voltage is 127.43 V Calculate the static error

- (a) 254.93V
- (b) 127.465V
- (c) +0.07V
- (b) - 0.07V

Ans: (c)

1754. Electric field is defined as the electric force per unit

- (a) Length
- (b) Charge
- (c) Flux
- (d) Momentum

Ans: (b)

1755. An instrument transformer is used to extend the range of

- (a) Induction instrument
- (b) Electrostatic instrument
- (c) Moving coil instrument
- (d) PMMC instrument

Ans: (a)

1756. Which of the following instrument is not affected by hysteresis and eddy current errors?

- (a) Electrostatic
- (b) Permanent magnet moving coil
- (c) Moving Iron
- (d) Dynamometer type moving coil

Ans: (a)

1757. Error detector is also called as

- (a) Multiplexer
- (b) Decoder
- (c) Comparator
- (d) Integrator

Ans: (c)

1758. The ratio of output change for a given measuring system is referred to as

- (a) Sensitivity
- (b) Linearity
- (c) Stability
- (d) Fidelity

Ans: (a)

1759. Repeatability and Reproducibility are related to:

- (a) Accuracy of the instrument
- (b) Precision of the instrument
- (c) Both accuracy of the instrument & precision
- (d) None of these

Ans: (b)

1760. Which of the following is true?

- (a) Accuracy can be achieved without precision
- (b) Precision can be achieved without accuracy
- (c) Both Accuracy can be achieved without precision & Precision can be without accuracy
- (d) None of these

Ans: (b)

1761. A set of readings has a wide range and therefore it has ---

- (a) High precision
- (b) High accuracy
- (c) Low accuracy
- (d) Low precision

Ans: (d)

1762. In a measurement systems, which of the following static characteristic are desirable.

- (a) Accuracy
- (b) Sensitivity
- (c) Reproducibility
- (d) All of these

Ans: (d)

1763. A 100 mA meter has an accuracy of $\pm 2\%$. Its accuracy while reading 10 mA will be

- (a) $\pm 2\%$
- (b) $\pm 0.2\%$
- (c) $\pm 4\%$
- (d) $\pm 20\%$

Ans: (d)

1764. A generated voltage is equally dependent on three resistances R_1 , R_2 , R_3 and its value $V = R_1 R_2 / R_3$. If tolerance of each resistor is 0.1%, what will be the maximum error in voltage?

- (a) 0.03%
- (b) $\pm 0.3\%$
- (c) 0.01%
- (d) $\pm 0.1\%$

Ans: (b)

1765. Which one of the following statements correctly response the systematic error?

- (a) These error can be calculated from the details of the instrument
- (b) These are the residual errors
- (c) These errors may occur under controlled conditions
- (d) These are the error committed by the experiments

Ans: (a)

1766. For accuracy of the instrument which is necessary-

- (a) Conformity
- (b) Precision
- (c) Both (a) and (b)
- (d) None of these

Ans: (c)

1767. A null type of instrument as compared to a deflecting type instrument has

- (a) Higher accuracy
- (b) Lower sensitivity
- (c) Faster response
- (d) All of the above

Ans: (a)

1768. Calculate the limiting error of an ammeter of range 25A given also that it has a guaranteed accuracy of 1% of full-scale reading. The current measured by the ammeter is 5A.

- (a) 2%
- (b) 2.5%
- (c) 4%
- (d) 5%

Ans:

(d)

1769. Choose the INCORRECT statement amongst the given statements.

- (a) Sensitivity of an instrument is directly proportional to deflection factor
- (b) Precision of an instrument does not assure accurate results
- (c) An instrument with more significant figures has more precision
- (d) An instrument required high degree of sensitivity

Ans: (a)

1770. The pointer of an indicating instrument should be:

- (a) very light
- (b) very weighty
- (c) light
- (d) weighty

Ans: (a)

1771. The most suitable material for spring in majority of the measuring instruments, except in low resistance instruments is :

- (a) Phosphor-bronze
- (b) Platinum silver
- (c) Hard rolled silver
- (d) Silicon-bronze

Ans: (a)

1772. A pointer of the instrument once deflected returns to zero position when the current is removed due to :

- (a) Action of gravity
- (b) Mass of the pointer
- (c) Controlling torque
- (d) Damping torque

Ans: (c)

1773. In an instrument transformer the errors can be reduced by

- (a) Using high reluctance core
- (b) Using small cross sectional area
- (c) Using low permeability materials
- (d) Using low reluctance core

Ans: (d)

1774. In an Induction type meter, maximum torque is produced when the phase angle between two fluxes is-

- (a) 0°
- (c) 60°
- (b) 45°
- (d) 90°

Ans: (d)

1775. Which of the following describes the linearity of an instrument?

- (a) Largest change in measured variable which produces no instrument response
- (b) Closeness of the calibration curve to a specified straight line
- (c) Closeness of the indicated value to the measured
- (d) Range of an inaccuracy which can be tolerated

Ans: (b)

1776. In a critically damped system, the damping factor of the system is

- (a) Zero
- (b) Less than unity
- (c) Unity
- (d) Greater than unity

Ans: (c)

1777. Indicating instruments should be

- (a) undamped
- (b) critically damped
- (c) over damped
- (d) under damped

Ans: (d)

1778. Determine the absolute error of measurement if measured value of a resistance = 20.65Ω and true value = 20.55Ω .

- (a) 0.1Ω
- (b) 0.2Ω
- (c) 0.3Ω
- (d) 0.4Ω

Ans: (a)

1779. Which torque is essential for indicating instruments

- (a) Deflecting
- (b) Controlling
- (c) Damping
- (d) All of these

Ans: (d)

1780. Damping torque is essential to

- (a) Increase oscillation
- (b) Reduce oscillation
- (c) Maintain oscillation unchanged
- (d) None of these

Ans: (b)

1781. Which instrument has/have uniform scale?

- (a) Spring control instrument
- (b) Gravity control instrument
- (c) Both (a) and (b)
- (d) None of these

Ans: (a)

1782. Ideally, the damping torque should be

- (a) proportional to velocity of the moving system and operating current
- (b) proportional to the velocity of the moving system but independent of operating current
- (c) independent of the velocity of the moving system and proportional to the operating Current
- (d) Independent of the velocity of the moving system and operating current

Ans: (b)

1783. In case of over damping the instrument will become

- (a) Oscillating
- (b) Dead
- (c) Fast and sensitive
- (d) Slow and lethargic

Ans: (d)

- 1784.** The damping force acts on the moving system of an indicating instrument only when it is
- (a) Moving
 - (b) Stationary
 - (c) Near its full deflection
 - (d) Just starting to move

Ans: (c)

- 1785.** Two meters X and Y require 40 mA and 50mA for full scale deflection. Which of the following is correct?
- (a) X is more sensitive
 - (b) Y is more sensitive
 - (c) Both are equally sensitive
 - (d) It is not possible to determine the relation between the sensitivity of the meters from the given data

Ans: (a)

- 1786.** 55. A zero to 300V voltmeter has an error of 2% on full scale deflection. If the true voltage is 30V then the range of readings on this voltmeter will be:
- (a) 20 to 40 V
 - (b) 26.4 to 33.6 V
 - (c) 29.4 to 30.6 V
 - (d) 24 to 36 V

Ans: (d)

- 1787.** The most basic of all instrument is
- (a) The current meter
 - (b) The voltmeter
 - (c) The multimeter
 - (d) The oscilloscope

Ans: (b)

- 1788.** A voltage using a 20 μA meter movement has a sensitivity of
- (a) 20 $\mu\Omega/\text{V}$
 - (b) 1000 Ω/V
 - (c) 20,000 Ω/V
 - (d) 50,000 Ω/V

Ans: (d)

- 1789.** A voltmeter uses a meter with $I_{fs}=2\text{ mA}$. Its sensitivity is
- (a) 500 Ω/V
 - (b) 500 V/Ω
 - (c) 200 Ω/V
 - (d) 2000 V/Ω

Ans: (a)

1790. The sensitivity of a voltmeter using 0 to 20 mA meter movement is :

- (a) 500 ohm/volt
- (b) 100 ohm/volt
- (c) 50 ohm/volt
- (d) 20 ohm/volt

Ans: c

1791. The span of a zero centered voltmeter having a scale from -15 V to +15 V is:

- (a) -30 V
- (c) 0 V
- (b) 30 V
- (d) 15 V

Ans: (b)

1792. The voltage of a circuit is measured by a voltmeter whose input impedance is low as compared to the output impedance of the circuit. The error caused will be due to

- (a) Random error
- (b) Loading effect
- (c) Gross error
- (d) System error

Ans: (b)

1793. If a galvanometer is sensitive, it will provide large deflection on providing

- (a) no current
- (b) large power
- (c) small current
- (d) large voltage

Ans: (c)

1794. Resistance can be measured by- 1. Ohmmeters 2. Resistance bridges 3. Wattmeters 4. Ampere-hour meters

- (a) 2 and 3 only
- (b) 2, 3 and 4 only
- (c) 1 and 3 only
- (d) 1 and 2 only

Ans: (d)

1795. Which of the following cannot be measured by multimeters?

- (a) Frequency
- (b) Current
- (c) Resistance
- (d) Voltage

Ans: (a)

1796. Zero adjustment becomes necessary in analog multimeter before measuring:

- (a) Wattage
- (b) Resistance
- (c) Current
- (d) Voltage

Ans: (b)

1797. The largest change in the measured variable which produces no instrument response is called :

- (a) Dead band
- (b) Dynamic error
- (c) Fidelity
- (d) Threshold

Ans: (a)

1798. What is a Weston frequency meter?

- (a) Moving coil instrument
- (b) Moving iron instrument
- (c) Dynamometer type instrument
- (d) Induction instrument

Ans: (b)

1799. What is the name of the instrument used to measure the specific density of a battery :

- (a) Pyrometer
- (b) Hydrometer
- (c) Lactometer
- (d) Fuel gauge

Ans: (b)

1800. What principle makes the instrument transformer working?

- (a) Self Induction
- (b) Lenz law
- (c) Mutual induction
- (d) Fleming's right hand rule

Ans: c

1801. Which instrument is the cheapest disregarding the accuracy?

- (a) PMMC
- (b) Moving iron
- (c) Rectifier
- (d) Electrodynamometer

Ans: (b)

1802. 1 mA ammeter has a resistance of 100Ω . It is to be converted to a 1A ammeter. The value of shunt resistance is

- (a) $0.001\ \Omega$
- (b) $0.1001\ \Omega$
- (c) $1,00,000\ \Omega$
- (d) $100\ \Omega$

Ans: (b)

1803. Electrostatic instruments are used as only

- (a) Ammeters
- (b) Voltmeters
- (c) Watt meters
- (d) Energy meters

Ans: (b)

1804. A 50V range voltmeter has a sensitivity of $20k\ \Omega/V$. The total resistance of the voltmeter is

- (a) $2.5\ k\Omega$
- (b) $0.4\ k\Omega$
- (c) $10\ k\Omega$
- (d) $1\ M\Omega$

Ans: (d)

1805. Transformers used in conjunction with measuring instruments for measurement of high voltage and high currents are called

- (a) Transformers meters
- (b) Power transformers
- (c) Pulse transformers
- (d) Instrument transformers

Ans: (d)

1806. If the connections of a moving iron voltmeter connected in a circuit are interchanged, the voltmeter

- (a) Will not give any deflection
- (b) Will deflect in opposite direction
- (c) Reading will remain unaffected
- (d) Will burn out

Ans: (c)

1807. Which of the following instruments is exclusively used for measuring radio frequency currents?

- (a) Moving iron
- (b) Thermocouple
- (c) PMMC
- (d) Electrodynamic

Ans: (b)

1808. The ratio error in the current transformer is attributed to

- (a) Magnetizing component of no-load current
- (b) Energy component of excitation current
- (c) Leakage flux
- (d) Power factor of the primary

Ans: (a)

1809. An instrument gives maximum deflection for any amount of quantity passed through it. Which of the following pairs is present?

- (a) Deflecting and controlling
- (b) Controlling and damping
- (c) Deflecting and damping
- (d) Deflecting, controlling and damping

Ans: (c)

1810. A moving coil galvanometer is made into a dc ammeter by connecting

- (a) A low resistance across the meter
- (b) A high resistance in series with meter
- (c) A pure inductance across the meter
- (d) A capacitor in series with the meter

Ans: (a)

1811. The effect of stray magnetic fields on the actuating torque of a portable instrument is maximum when the operating field of the instrument and the stray fields are

- (a) Perpendicular
- (b) Parallel
- (c) Inclined at 60°
- (d) Inclined at 30°

Ans: (b)

1812. Identify the instrument which has no controlling torque

- (a) Electrostatic voltmeter
- (b) Power factor meter
- (c) Watt meter
- (d) Dynamometer type ammeter

Ans: (b)

1813. Megger is used for testing?

- (a) Open circuit only
- (b) Short circuit only
- (c) Open circuits, short circuits, earth resistance and insulation
- (d) Low resistances

Ans: (C)

1814. Pick the odd instrument out

- (a) Moving iron meter
- (b) Moving coil meter
- (c) Dynamometer wattmeter
- (d) Watt-hour meter

Ans: (d)

1815. A meter has a full scale deflection of 90° at a current of I_A . The response of the meter is square law. Assuming spring control, the current for a deflection at 45° will be

- (a) 0.25
- (b) 0.50
- (c) 0.707
- (d) 0.67

Ans: (c)

1816. In current transformers turns compensation is provided mainly to reduce the

- (a) Both ratio and phase angle errors
- (b) Phase angle error
- (c) Ratio error
- (d) Power losses

Ans: (c)

1817. PMMC type instrument normally use

- (a) No damping is required
- (b) Fluid-friction damping
- (c) Eddy current damping
- (d) Air-friction damping

Ans: (c)

1818. What will happen if a voltmeter is connected like an ammeter in series to the load?

- (a) There will be almost no current in the circuit
- (b) The measurement will be too high
- (c) An inadmissibly high current will flow
- (d) The meter will burn out

Ans: (a)

1819. Moving iron instruments can be used on

- (a) High frequency supply
- (b) DC only
- (c) Measure AC and DC
- (d) AC only

Ans: (c)

1820. The instrument whose deflection is given by the equation $\Theta \propto I^2 \frac{dM}{d\Theta}$ is known as

- (a) electrodynamic type
- (b) repulsion type
- (c) electrostatic type
- (d) attraction type

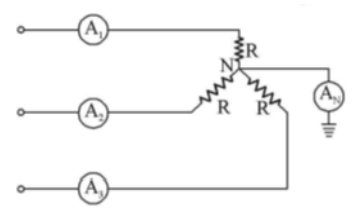
Ans: (a)

1821. Swamping resistance is added to the coil circuit

- (a) To increase the sensitivity
- (b) To reduce the temperature error
- (c) To reduce the error due to thermal emf
- (d) To reduce the power drawn by the instrument

Ans: (b)

1822. In the circuit shown in the given figure, three phase supply is connected to a star connected load. If ammeters A₁, A₂, A₃ read 12.5 A, what will be the reading of ammeter A_N



- (a) 37.5 A
- (b) $1/\sqrt{3}$ A
- (c) $37.5\sqrt{3}$ A
- (d) Zero

Ans: (d)

1823. An integrating digital voltmeter measures

- (a) True average value
- (b) RMS value
- (c) Peak value
- (d) Peak to peak value

Ans: (a)

1824. The scale of a voltmeter is uniform. Its type is

- (a) Moving iron
- (b) Induction
- (c) Moving coil permanent magnet
- (d) Moving coil dynamometer

Ans: (c)

1825. Wire wound resistors are unsuitable for use at high frequencies because

- (a) They are likely to melt under excessive eddy current
- (b) They exhibit unwanted inductive and capacitive effects
- (c) They create more electrical noise
- (d) They consume more power

Ans: (b)

1826. A 35 V DC supply is connected across a combined resistance of 600Ω and an unknown resistance of $R\Omega$ in series. If a voltmeter having a resistance of $1.2k\Omega$ is connected across 600Ω resistor and reads 5V, then what is the value of the resistance R

- (a) 120Ω
- (b) 500Ω
- (c) 1.7Ω
- (d) $2.4 k\Omega$

Ans: (d)

1827. A resistance is measured by the voltmeter ammeter method. The voltmeter reading is 50 V on 100 V scale and ammeter reading is 50 mA on 100 mA scale. If both the meters are guaranteed for accuracy with 2% of full scale, what is the limit within resistance can be measured?

- (a) 10 Ω
- (b) 20 Ω
- (c) 40 Ω
- (d) 80 Ω

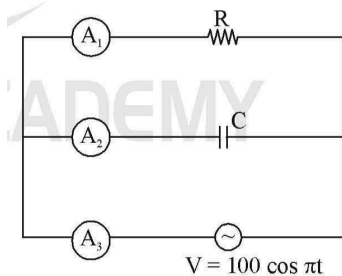
Ans: (d)

1828. Assertion (A): In general, moving non voltimeters are less accurate than those of the dynamometer type. Reason (R): Moving iron voltmeters often use air-friction damping.

- (a) Both A and R are individually true and R is the correct explanation of A.
- (b) Both A and R are individually true and R is not the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

Ans: (b)

1829. In the figure shown below A1, A2 and A3 are ideal ammeters. If A2 and A3 read 4A and 5A respectively, what is the reading of A1?



- (a) 1 A
- (b) 3 A
- (c) 9 A
- (d) Cannot be calculated without the values of R and C

Ans: (b)

1830. If two 300V full-scale voltmeters V1 and V2 having sensitivity of $100\text{k}\Omega/\text{V}$ and $150\text{k}\Omega/\text{V}$ respectively are connected in series to measure 500 V, then

- (a) V1 and V2 will read 250 V each
- (b) V1 will read 200 V and V2 will read 300 V
- (c) V1 will read 300 V and V2 will read 200 V
- (d) V1 and V2 will read 0V each

Ans: (b)

1831. An instrument that measures the insulation resistance of system using a self provide 1000 V DC generator is called

- (a) VTVM
- (b) Megger
- (c) Thermocouple instrument
- (d) Multimeter

Ans: (b)

1832. Which one of the following variable cannot be measured directly by a CRO?

- (a) Current
- (b) Voltage
- (c) Phase difference
- (d) Frequency

Ans: (a)

1833. In moving coil meters, damping is provided by

- (a) Eddy current disk
- (b) The aluminium frame of the coil
- (c) Damping vane in the air-tight chamber
- (d) The coil spring attached to the moving mechanism

Ans: (b)

1834. A 2V peak to peak symmetrical wave is given to a rectifier type AC voltmeter. The voltmeter will read

- (a) 2.22 V
- (b) 1.11 V
- (c) 1 V
- (d) Zero

Ans: (b)

1835. A moving iron instrument has 10Ω resistance and gives a full scale deflection when carrying 50 mA. It can be used to measure 750 V by 500 V, then using a resistance of

- (a) $0.005002\ \Omega$ in series
- (b) $0.005002\ \Omega$ in parallel
- (c) 14990Ω in series
- (d) 14990Ω in parallel

Ans: (c)

1836. In eddy current damping systems, the disc employed should be of

- (a) Conducting and magnetic material
- (b) Conducting but non magnetic material
- (c) Magnetic but non conducting material
- (d) Non conducting and non magnetic material

Ans: (b)

1837. An analog voltmeter has a sensitivity of $10\text{ k}\Omega/\text{volt}$. The galvanometer used constructing the instrument will produce

- (a) 10 mA
- (b) 20 mA
- (c) 50 mA
- (d) $100\ \mu\text{A}$

Ans: (d)

1838. A 0.1A ammeter having a resistance of 10Ω is to be converted to a 1A ammeter by using shunt resistance. Which one of the following is the most appropriate shunt resistance?

- (a) 0.1 Ω
- (b) 1.0 Ω
- (c) 1.1 Ω
- (d) 1.2 Ω

Ans: (c)

1839. For a given frequency, the deflecting torque of an induction ammeter is directly proportional to

- (a) Current²
- (b) Current³
- (c) $\sqrt{\text{current}}$
- (d) Current

Ans: (a)

1840. The basic principle of D' Arsonval instrument is the same as the principle of a

- (a) Moving iron instrument
- (b) PMMC instrument
- (c) Induction instrument
- (d) None of these

Ans: (b)

1841. The damping torque in a measuring instrument can be produced by

- (a) Eddy current
- (b) Gravity control
- (c) Electro statically
- (d) Thermally

Ans: (a)

1842. The deflection expression $\Theta \propto V^2 dC/d\Theta$ corresponds to

- (a) Moving iron type instruments
- (b) Electrodynamic type instruments
- (c) Electrostatic type instruments
- (d) Induction type instruments

Ans: (c)

1843. No eddy current and hysteresis losses occur in

- (a) Electrostatic instruments
- (b) PMMC type instruments
- (c) Moving-iron instruments
- (d) Electrodynamometer instruments

Ans: (a)

1844. for increasing the range of voltmeter, connect a

- (a) High value resistance in series with voltmeter
- (b) Low value resistance in series with voltmeter
- (c) High value resistance in parallel with voltmeter
- (d) Low value

Ans: (a)

1845. In a gravity controlled instrument, controlling torque is proportional to

- (a) Θ
- (b) Θ^2
- (c) $\sin\Theta$
- (d) None of these

Ans: (c)

1846. Electrostatic instruments are normally used for

- (a) Low current measurements
- (b) High current measurements
- (c) Low voltage measurements
- (d) High voltage measurements

Ans: (d)

1847. Which instrument has necessarily the 'square law' type scale?

- (a) Permanent magnet moving coil
- (b) Hot wire instruments
- (c) Moving iron repulsion
- (d) None of the above

Ans: (b)

1848. A rectifier instrument is used to measure an alternating square wave of amplitude 100V. What is the meter reading?

- (a) 100 V
- (b) 70.7 V
- (c) 111 V
- (d) None of these

Ans: (c)

1849. The materials to be used in the manufacture of a standard resistance should be of

- (a) High resistivity and low temperature coefficient
- (b) Low resistivity
- (c) High temperature coefficient
- (d) Low resistivity and high temperature coefficient

Ans: (a)

1850. An unshielded moving iron voltmeter is used to measure the voltage in an AC circuit. If a stray DC magnetic field having a component along the axis of the meter coil appears, the meter reading would be

- (a) Unaffected
- (b) Decreased
- (c) Increased
- (d) Either decreased or increased depending on the direction of the DC field

Ans: (d)

1851. Which one of the following is basically a current sensitive instrument?

- (a) Permanent magnet moving coil instrument
- (b) Cathode ray oscilloscope
- (c) Electrostatic instrument
- (d) FET input electronic voltmeter

Ans: (a)

1852. Which one of the following types of instruments can be used to determine the r.m.s. value of a.c voltage of high magnitude (10 kV) and of any a.c. wave shape?

- (a) Moving iron instruments
- (b) Dynamometer type instruments
- (c) Induction instruments
- (d) Electrostatic instruments

Ans: (d)

1853. Which one of the following decides the time of response of an indicating instrument ?

- (a) Deflecting system
- (b) Controlling system
- (c) Damping system
- (d) Pivot and Jewel bearing

Ans: (c)

1854. A Galvanometer has

- (a) Air friction damping
- (b) Fluid friction damping
- (c) Eddy current damping
- (d) Electromagnetic damping

Ans: (d)

1855. In a permanent magnet moving coil instrument, if the control spring is replaced by another one having a higher spring constant, then the natural frequency and damping ratio will

- (a) Decrease
- (b) Increase and decrease respectively
- (c) Decrease and increase respectively
- (d) Increase

Ans: (b)

1856. Which meter has the highest accuracy?

- (a) PMMC
- (b) Moving iron
- (c) Electrodynamometer
- (d) Rectifier

Ans: (a)

1857. Rectifier Moving Coil Instruments respond to

- (a) Peak value, irrespective of the nature of the waveform
- (b) Average value, all waveforms
- (c) Rms value for all waveforms
- (d) Rms value, for symmetrical square waveforms

Ans: (b)

1858. An average response rectifier type electronic AC voltmeter has a DC voltage of 10 V applied to it. The meter reading will be

- (a) 7.1 V
- (b) 10.0 V
- (c) 11.1 V
- (d) 22.2 V

Ans: (c)

1859. In a galvanometer, the deflection becomes one half when the galvanometer is shunted by a 20 ohm resistor. The galvanometer resistance is:

- (a) 5 ohm
- (b) 10 ohm
- (c) 40 ohm
- (d) 20 ohm

Ans: (d)

1860. Clamp on ammeter is used for measurement of:

- (a) Large alternating currents
- (b) Small direct currents
- (c) Small alternating currents
- (d) Large direct currents

Ans: (a)

1861. An ammeter has a current range of 0-5 A, and its internal resistance is $0.2\ \Omega$. In order to change the range to 0-25A, what should be the value of resistance added and how it would connect with meter (*i.e.* series/parallel)?

- (a) $(0.05\ \Omega/\text{series})$
- (b) $(0.05\ \Omega/\text{parallel})$
- (c) $(0.20\ \Omega/\text{parallel})$
- (d) $(0.20\ \Omega/\text{series})$

Ans: (b)

1862. The potential transformers Nominal Ratio is defined as the ratio of:

- (a) Primary winding voltage and secondary winding voltage
- (b) Rated primary winding voltage and rated secondary winding voltage
- (c) Primary winding turns and secondary winding turns
- (d) Any of the above

Ans: (b)

1863. The measurement range of an ammeter can be increased by using a:

- (a) High resistance in shunt
- (b) Low resistance in shunt
- (c) High resistance in series
- (d) Low resistance in series

Ans: (b)

1864. A permanent magnet moving coil ammeter has a coil resistance of 99 ohm and Full Scale Deflection (FSD) current of 0.1 mA. Shunt resistance is 1 ohm. Current through the meter at 0.5 F.S.D is:

- (a) 0.007mA
- (b) 0.05mA
- (c) 0.023mA
- (d) None of these

Ans: (b)

1865. A DC ammeter has a resistance of 0.1Ω and its currents range is 0-100 A. If the range is to be extended to 0-500 A, then the shunt resistance should be :

- (a) 0.5Ω
- (c) 0.025Ω
- (b) 0.25Ω
- (d) 0.05Ω

Ans: (c)

1866. Which of the following can be measured by a multimeter?

- (a) Voltage
- (b) Resistance
- (c) Current
- (b) Resistance
- (d) All the above

Ans: (d)

1867. An instrument which detects electric current is known as

- (a) Voltmeter
- (c) Wattmeter
- (b) Rheostat
- (d) Galvanometer

Ans: (d)

1868. What should be the properties and mode of connection of the shunts and multipliers used to increase the ranges of voltmeters and ammeters?

- (a) Shunts - low resistance connected in parallel with ammeters
- (b) Shunts - high resistance, connected in series with ammeters
- (c) Multipliers - low resistance, connected in series with voltmeters
- (d) Multipliers - high resistance, connected in parallel with voltmeters

Ans: (a)

1869. Which of the following statements is not an advantage of Electrodynamic instruments?

- (a) Free from hysteresis errors
- (b) Low power consumption
- (c) Precision grade accuracy
- (d) Low sensitivity

Ans: (d)

1870. Which among the following is not a method for measurement of High Resistance?

- (a) Direct deflection method
- (b) Megaohm method
- (c) Megger
- (d) Loss of current method

Ans: (d)

1871. A Q-meter measures:

- (a) Loss in a capacitor
- (b) Frequency
- (c) Accurate value of electrical quantity
- (d) Properties of the coils

Ans: (d)

1872. The ratio error in current transformer is due to:

- (a) Power factor of primary
- (b) Wattless component of the current in the primary
- (c) Exciting current
- (d) Leakage flux

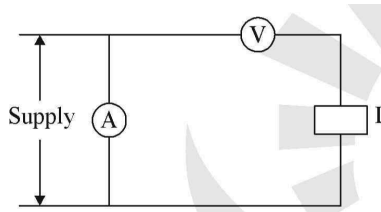
Ans: (c)

1873. The deflection torque can be produced by:

- (a) Gravity control
- (b) Spring control
- (c) Air friction
- (d) Magnetically

Ans: (d)

1874. By mistake voltmeter and ammeter are connected as shown in the figure below:



- (a) Only voltmeter will burn away
- (b) Only ammeter will burn away Load
- (c) Both voltmeter and ammeter will burn away
- (d) None will burn away

Ans: (b)

1875. If 2% of main current is to be passed through a moving coil galvanometer of resistance G ; the resistance of shunt required is

- (a) $G/49$
- (c) $49G$
- (b) $G/50$
- (d) 500

Ans: (a)

1876. Under operating conditions the secondary of CT is always short circuited because

- (a) It protects the primary circuit
- (b) It is safe to human beings
- (c) It avoids core saturation and HV induction
- (d) All the above

Ans: (b)

1877. The most efficient form of damping employed in electric instruments is

- (a) Air friction damping
- (b) Fluid friction damping
- (c) Eddy current damping
- (d) None of the above

Ans: (c)

1878. Which of the following instruments is equally accurate on ac as well as de circuits?

- (a) PMMC voltmeter
- (b) Dynamometer wattmeter
- (c) Moving iron ammeter
- (d) Induction wattmeter

Ans: (b)

- 1879.** The moving system of an indicating type of electrical instrument is subjected to
- (a) A deflecting torque
 - (b) A controlling torque
 - (c) A damping torque
 - (d) All of the above

Ans: (d)

- 1880.** The type of instruments used mainly for standardizing instruments in laboratories is
- (a) Indicating instrument
 - (b) Integrating instrument
 - (c) Absolute instrument
 - (d) Recording instrument

Ans: (c)

- 1881.** Series resistance required to read 0-250 V with a moving coil instrument of internal resistance 2 ohm and full scale deflection of 50 mA is
- (a) 49998 Ω
 - (b) 4998 Ω
 - (c) 498 Ω
 - (d) 49.8 Ω

Ans: (b)

- 1882.** Which of the following is not a method of resistance measurement?
- (a) Ammeter - Voltmeter method
 - (b) Post - Office box method
 - (c) Ohm - Meter method
 - (d) Two wattmeter method

Ans: (d)

- 1883.** Internal resistance of a micro-ammeter is 500 ohm. Shunt resistance required to increase its range from 0-100 μA to 0-10 A will be approximately
- (a) 0.05 Ω
 - (b) 0.005 Ω
 - (c) 0.5 Ω
 - (d) 5.0 Ω

Ans: (b)

- 1884.** In a particular meter, the deflecting torque is directly proportional to the current flowing through it, the type of meter is
- (a) Moving coil
 - (c) Induction
 - (b) Moving iron
 - (d) Electro-static

Ans: (a)

1885. Megger is used to measure

- (a) Very high resistance or insulation resistance
- (b) Low resistance
- (c) High resistance
- (d) Very low resistance

Ans: (a)

1886. A null type of instrument as compared to a deflecting type instrument has

- (a) Higher accuracy
- (b) Lower sensitivity
- (c) Faster response
- (d) All of the above

Ans: (a)

1887. The sensitivity of a voltmeter using 0-5 mA meter movement is

- (a) 200 Ω/V
- (b) 150 Ω/V
- (c) 100 Ω/V
- (d) 50 Ω/V

Ans: (a)

1888. Moving coil instruments have which one of the following scales?

- (a) Logarithmic scale
- (b) Uniform scale
- (c) Non-uniform scale
- (d) Squared scale

Ans: (b)

1889. The material of hair spring used in measuring instruments is made of which of material of the following:

- (a) Copper
- (b) Bronze
- (c) Alnico
- (d) None of these

Ans: (b)

1890. Ballistic galvanometer is calibrated to measure:

- (a) Current
- (b) Voltage
- (c) Resistance
- (d) Charge

Ans: (d)

1891. Voltmeter has

- (a) Low resistance
- (b) High resistance
- (c) Infinite resistance
- (d) Zero resistance

Ans: (b)

1892. Which of the following is not a requirement for a DC ammeter's shunt?

- (a) High thermal automotive force
- (b) Time-invariant
- (c) Low temperature coefficient
- (d) Carry current without excessive temperatures

Ans: (a)

1893. Scale of Moving Iron instruments is:

- (a) Linear
- (b) Non-uniform
- (c) Exponential
- (d) Logarithmic

Ans: (b)

1894. Which of the following is not a type of operating force in Electromechanical Indicating Instrument?

- (a) Deflecting force
- (b) Controlling force
- (c) Damping force
- (d) Gravitational force

Ans: (d)

1895. Which of the following is an Integrating instrument?

- (a) Watt-hour meter
- (b) Ammeter
- (c) Voltmeter
- (d) Wattmeter

Ans: (a)

1896. In PMMC instruments, torque/deflection produced in the coil is ___current flowing through it.

- (a) Directly proportional
- (b) inversely proportional
- (c) Directly proportional to the square of
- (d) Inversely proportional to the square of

Ans: (a)

1897. Electrostatic instrument measures:

- (a) DC and AC voltage only
- (b) DC and AC current only
- (c) DC and AC current and voltage both
- (d) DC voltage only

Ans: (a)

1898. An ammeter has a current range of 0-5A and its internal resistance is 0.4Ω . In order to change the range to 0-50 A, we need to add a resistance of

- (a) 0.4Ω in series with the meter
- (b) 1.0Ω in series with the meter
- (c) 0.044Ω in parallel with the meter
- (d) 0.055Ω in parallel with the meter

Ans: (c)

1899. A galvanometer has sensitivity of 50 and has a resistance of 100Ω . The multiplying power (the ratio of measured current to galvanometer current) of 10Ω shunt with this galvanometer is

- (a) 11
- (b) 100
- (c) 110
- (d) 10

Ans: (a)

1900. An average-reading meter reads 20V when fed with a triangular wave, symmetric about the time axis. For the same input an rms-reading meter will read:

- (a) 40 V
- (b) 23.09 V
- (c) 20 V
- (d) 10.5 V

Ans: (b)

1901. A moving coil of a meter has 400 turns and a length and depth of 20 mm and 20 mm respectively. It is positioned in a uniform radial flux density of 200 mT. The coil carries a full scale current of 25 mA. The torque on the coil is ----- and sensitivity is-----

- (a) $800\mu\text{Nm}$, $40\Omega/\text{V}$
- (b) $800\mu\text{Nm}$, $25\Omega/\text{V}$
- (c) $200\mu\text{Nm}$, $100\Omega/\text{V}$
- (d) $800\mu\text{Nm}$, $1\Omega/\text{V}$

Ans: (a)

1902. With a multiplier setting of $30\text{ k}\Omega$, it reads 400 V and with a multiplier setting of $80\text{ k}\Omega$, it reads 250 V For a multiplier setting of $20\text{ k}\Omega$, the voltmeter reads

- (a) 371 V
- (b) 483 V
- (c) 437.5 V
- (d) 455 V

Ans: (d)

1903. A permanent magnet moving coil ammeter has a coil resistance of 99 ohm and Full Scale Deflection (FSD) current of 0.6 mA with shunt resistance of 1 ohm . Current through the meter at 0.5 F.S.D. is

- (a) 0.007 mA
- (b) 0.05 mA
- (c) 0.3 mA
- (d) 0.01 mA

Ans: (c)

1904. A current of $10+6\sin(\omega t+30^\circ)\text{ A}$ is passed through two meters. They are a PMMC meter and a moving iron instrument. The respective reading (in A) will be

- (a) 10 A and 10 A
- (b) 10 A and 16 A
- (c) 10 A and 10.86 A
- (d) 0 A and 6 A

Ans: (c)

1905. A PMMC voltmeter is connected across a series combination of DC voltage source $V_1 = 12\text{ V}$ and AC voltage source $V_2(t) = 9\sin(4t)\text{ V}$ The meter reads:

- (a) 13 V
- (b) 15 V
- (c) 12 V
- (d) 7.5 V

Ans: (c)

1906. Which part/phenomenon controls the controlling torque in megger?

- (a) Earthing
- (c) Spring
- (b) Leakage current
- (d) Coil

Ans: (d)

1907. Which instrument has the multiple shunt or series resistances inside the meter?

- (a) Moving coil galvanometer
- (b) Multimeter
- (c) Multirange meter
- (d) Wattmeter

Ans: (c)

1908. Of what material, swamping resistance is made up?

- (a) Alloy of nickel and cobalt
- (b) Alloy of manganin and aluminium
- (c) Alloy of manganin and copper
- (d) None of these

Ans: (c)

1909. Alternating current is measured by

- (a) Induction ammeter
- (b) Electrostatic ammeter
- (c) Moving iron repulsion type voltmeter
- (d) Permanent magnet ammeter

Ans: (a)

1910. In a 3-phase dynamometer type power factor meter, two moving coil planes are inclined at an angle of

- (a) 180°
- (b) 120°
- (c) 90°
- (d) 45°

Ans: (b)

1911. The insulation resistance test is carried out by the instrument

- (a) Ammeter
- (b) Voltmeter
- (c) Megger
- (d) Energymeter

Ans: (c)

1912. Which of the following type of instrument is used only for D.C?

- (a) Moving iron-attraction type
- (b) Moving iron-repulsion type
- (c) Permanent magnet type
- (d) Hot wire type

Ans: (c)

1913. Which of the following is not an Integrating instrument?

- (a) Ampere hour meter
- (b) Watt hour meter
- (c) Volt meter
- (d) None of these

Ans: (c)

1914. Hot wire ammeters are used for measuring:

- (a) Only AC
- (b) Only DC
- (c) Neither AC nor DC
- (d) Both AC and DC

Ans: (d)

1915. Rectifier type instrument can be use in

- (a) AC
- (b) DC
- (c) Both (a) and (b)
- (d) Pulsating

Ans: (a)

1916. Induction type instrument can be employed for

- (a) Alternating Currents only
- (b) Direct Current only
- (c) AC and DC both
- (d) Usually DC for heavy currents

Ans: (a)

1917. A 0 to 300V voltmeter has guaranteed accuracy of 1 % full scale reading. The voltage measured by the instrument is 83 V. The percent limiting error Is:

- (a) 0.95
- (b) 1.81
- (c) 3.62
- (d) 4.85

Ans: (c)

1918. A 300 V voltmeter has an accuracy of $\pm 2\%$ of full scale deflection. When the reading is 222 V, the actual voltage:

- (a) Lies between 217.56 and 226.44 V
- (b) Lies between 217.4 and 226. 6 V
- (c) Lies between 216 and 228 V
- (d) Is exact 222 V

Ans: (c)

1919. A 0-200 V voltmeter has an accuracy of 0.75% of full scale reading. If voltage measured is 100V, the error is:

- (a) 3%
- (b) 2%
- (c) 1.5%
- (d) 0.75%

Ans: c

1920. An instrument has sensitivity of 1000 ohms/volt on the 100 volt scale. The instrument will have internal resistance of

- (a) 10 ohms
- (b) 10000 ohms
- (c) 1000 ohms
- (d) 100000 ohms

Ans: (d)

1921. Strike out the features not to be associated with the rectifier instruments

- (a) Small power loss
- (b) High degree of measuring accuracy
- (c) High sensitivity
- (d) None of these

Ans: (d)

1922. A meter having a sensitivity of 2 k Ω /V is used for the measurement of voltage across a circuit having an output resistance of 1 k Ω and an open circuit voltage of 8V. What is the reading of the meter at its 10V scale?

- (a) 5.72 V
- (b) 6.51 V
- (c) 7.62 V
- (d) 7.91 V

Ans: (c)

1923. Swamp resistance and condenser are used

- (a) To reduce the error while measuring DC quantities in a moving iron instrument
- (b) To reduce the error while measuring AC quantities in a moving iron instrument
- (c) To reduce the error while measuring DC quantities in a moving coil instrument
- (d) None of the above

Ans: (b)

1924. A PT is a device which is :

- (a) Electrostatically coupled
- (b) Electrically coupled
- (c) Electromagnetically coupled
- (d) Conductively coupled

Ans: (c)

1925. The current and potential transformers are used to measure the:

- (a) Low current and low voltage
- (b) High current and low voltage
- (c) High voltage and low current
- (d) High current and high voltage

Ans: (d)

1926. A PMMC meter can be used as an ammeter using:

- (a) Series resistors
- (b) Shunt inductors
- (c) Shunt resistors
- (d) Series inductors

Ans: (c)

1927. Moving iron type instruments are used for measurement of:

- (a) Earth resistance
- (b) Only alternating currents and voltages
- (c) Alternating, direct currents and voltages
- (d) Only direct currents and voltages

Ans: (c)

1928. Which of the following instruments is generally used for measuring d.c. current:

- (a) M.C. Type
- (b) M.I. type
- (c) Dynamometer type
- (d) Induction type

Ans: (a)

1929. A spring controlled moving iron voltmeter draws a current of 1 mA for full scale value of 100 V. If it draws a current of 0.5 mA, the meter reading is:

- (a) 25 V
- (b) 50 V
- (c) 100 V
- (d) None of these

Ans: (a)

1930. In the below given deflecting torque equation 'B' indicates $T_d = B \cdot I \cdot N \cdot A$

- (a) Constant
- (b) Flux Density
- (c) Current flowing throughout the meter
- (d) Number of turns in the coil

Ans: (b)

1931. Eddy current damping can not be used for moving iron instrument because:

- (a) The weight of the instrument will increase
- (b) The presence of permanent magnet required for this purpose will affect the deflection and the instrument reading
- (c) The size of instrument will increase
- (d) Eddy current will pass through iron and thereby cause loss

Ans: (b)

1932. In PMMC instruments, damping is provided by:

- (a) The coil itself
- (b) Separate pair of magnets
- (c) An aluminium frame on which the coil is wound
- (d) Damping vane in an airtight chamber

Ans: (c)

1933. Two 100 V full scale PMMC type DC voltmeter having Figure of Merits (FOM) of 10 k Ω /V and 20k Ω /V are connected in series. The series combination can be used to measure a maximum DC voltage of:

- (a) 200 V
- (b) 100 V
- (c) 150 V
- (d) 300 V

Ans: (c)

1934. A linear scale used in

- (a) Thermocouple meters
- (b) Moving iron meters
- (c) Hotwire meters
- (d) None of these

Ans: (d)

1935. PMMC (D' Arsonval) is used for

- (a) AC current
- (b) DC voltage
- (c) AC voltage
- (d) All of the above

Ans: (b)

1936. Which meter has the highest accuracy in the prescribed limit of frequency range

- (a) Rectifier
- (b) Electrodynamic meter
- (c) PMMC
- (d) Moving iron

Ans: (b)

1937. In ___ instruments the deflecting torque depends on the frequency

- (a) Induction type instruments
- (b) Hot wire instruments
- (c) Moving iron instruments
- (d) Moving coil instruments

Ans: (a)

1938. A moving coil instrument, having coil resistance of $4.5\ \Omega$ gives a full scale deflection of $30\ \text{mA}$.

The resistance connected in parallel with this instrument to read up to $2.5\ \text{A}$ is

- (a) $6.46\ \Omega$
- (b) $0.0346\ \Omega$
- (c) $0.0546\ \Omega$
- (d) $0.0625\ \Omega$

Ans: (c)

1939. In a particular meter, the operating torque is directly proportional to the current passing through it, then the type of meter is

- (a) Moving iron
- (b) Moving coil
- (c) Electrostatic
- (d) Induction

Ans: (b)

1940. What is a Weston frequency meter?

- (a) Moving coil instrument
- (b) Moving iron instrument
- (c) Dynamometer type instrument
- (d) Induction instrument

Ans: (b)

1941. Following is not an advantage of a permanent magnet moving coil instrument

- (a) It has a uniform scale
- (b) It can be used without error for a long period
- (c) It has good damping torque
- (d) Its range can be easily extended

Ans: (b)

1942. If a galvanometer is sensitive, it will provide large deflection on providing

- (a) No current
- (b) Large power
- (c) Small current
- (d) Large voltage

Ans: (c)

1943. Which of the following statements is not an advantage of Electrodynamic instruments?

- (a) Free from hysteresis errors
- (b) Low power consumption
- (c) Low accuracy
- (d) Low sensitivity

Ans: (d)

1944. In an attraction type moving Iron instrument, the damping torque is usually provided by

- (a) Air friction damping
- (b) Eddy current damping
- (c) Fluid friction damping
- (d) Capacitive damping

Ans: (a)

1945. Damping torque in measuring instruments provided by Fluid friction damping is mainly used

- (a) Where low magnetic fields are produced
- (b) Where high magnetic fields are produced
- (c) Where deflecting torque is minimum
- (d) Where permanent magnet produces the required deflecting torque

Ans: (c)

1946. Deflecting torque is __quantity under measurement in PMMC instruments.

- (a) Directly proportional to
- (b) Inversely proportional to
- (c) Directly proportional to square of
- (d) Inversely proportional to square of

Ans: (a)

1947. Identify the instrument which has no controlling torque

- (a) Electrostatic Voltmeter
- (b) Power factor meter
- (c) Watt meter
- (d) Dynamometer type Ammeter

Ans: (b)

1948. PMMC meter is fitted in

- (a) Ammeter
- (b) Voltmeter
- (c) Multimeter
- (d) Wattmeter

Ans: (c)

1949. Deflection produced in moving iron instruments is :

- (a) Proportional to rms value of operating current
- (b) Proportional to square of rms value of operating current
- (c) Inversely proportional to rms value of operating current
- (d) Inversely proportional to square of rms value of operating current

Ans: (b)

1950. Damping of deflection type instruments is done to

- (a) Reduce the oscillation of the pointer in the final deflected position
- (b) Make the moving system slow
- (c) Make the moving system fast
- (d) Reduce the angle of deflection of the pointer on the graduated scale

Ans: (a)

1951. A moving iron instrument gives correct reading when used at-

- (a) Low frequency
- (b) High frequency
- (c) Only one frequency
- (d) All frequencies to a certain value

Ans: (c)

1952. In a portable instrument, the controlling torque is provided by :

- (a) Spring
- (b) Gravity
- (c) Eddy currents
- (d) Damping friction

Ans: (a)

1953. PMMC ammeter have uniform scale because:

- (a) Of eddy current damping
- (b) They are spring controlled
- (c) Their deflecting torque varies directly as current
- (d) Both spring controlled and having deflecting torque varies directly as current

Ans: (d)

1954. The instrument transformers are normally used to extend the range of

- (a) Induction instruments
- (b) Electrostatic instruments
- (c) Moving iron instruments
- (d) All of these

Ans: (c)

1955. A moving-coil permanent-magnet instrument can be used as _____ by using a low resistance shunt

- (a) Voltmeters
- (b) Ammeters
- (c) Ohmmeters and resistance bridges
- (d) All of these

Ans: (b)

1956. If the secondary burden of a current transformer is 15 VA and secondary current is 5 A, then the impedance of the connected load will be:

- (a) 0.6Ω
- (b) 5Ω
- (c) 6Ω
- (d) 10Ω

Ans: (a)

1957. An ammeter is convertible to a voltmeter by:

- (a) Changing the scale
- (b) Putting a large resistance in parallel with the actual measuring part of the instrument
- (c) Putting large resistance in series with the actual measuring part of the instrument
- (d) Simply installing the instrument in parallel with the circuit

Ans: (c)

1958. If an ammeter & a capacitor are connected in series on DC circuit the ammeter will:

- (a) Give continuous reading
- (b) Initially give & then will come to zero
- (c) Not give any reading
- (d) Give only half the reading

Ans: (b)

1959. A 1 mA D' Arsonval movement has resistance of 100Ω . It is to be converted to a 10 V voltmeter. The value of multiplier resistance is

- (a) 999Ω
- (b) 9999Ω
- (c) 9900Ω
- (d) 990Ω

Ans: (c)

1960. A meter movement with current sensitivity $100\ \mu\text{A}$ and internal resistance $100\ \Omega$ is required to measure current of $10\ \text{mA}$. What will the shunt resistance be equal to?

- (a) $1\ \Omega$
- (b) $0.98\ \Omega$
- (c) $0.99\ \Omega$
- (d) $1.010101\ \Omega$

Ans: (d)

1961. The deflecting torque of an Ammeter is directly proportional to the current passing through it and the instrument has full scale deflection of 90° for a current of $10\ \text{A}$. What deflection will occur for a current of $5\ \text{A}$ when the instrument has gravity control?

- (a) 30°
- (b) 45°
- (c) 60°
- (d) 90°

Ans: (a)

1962. Two voltmeters have the same range $0\text{--}400\ \text{V}$. The internal impedances are $30\ \text{k}\Omega$ and $20\ \text{k}\Omega$. If they are connected in series and $600\ \text{V}$ be applied across them, the readings are:

- (a) $360\ \text{V}$ and $240\ \text{V}$
- (b) $300\ \text{V}$ each
- (c) $400\ \text{V}$ and $200\ \text{V}$
- (d) Out of range for one of the meters and $100\ \text{V}$ for the other

Ans: (a)

1963. DC probes are generally used with a voltmeter to:

- (a) Decrease its range
- (b) Increase its range
- (c) Frequency independent
- (d) None of these

Ans: (a)

1964. A galvanometer may be converted into ammeter or voltmeter. In which of the following cases the resistance of the device will be the largest?

- (a) An ammeter of range $10\ \text{A}$
- (b) A voltmeter of range $5\ \text{V}$
- (c) An ammeter of range $5\ \text{A}$
- (d) A voltmeter of range $10\ \text{V}$

Ans: (d)

1965. For a $1000\ \mu\text{A}$ movement with $100\ \Omega$ R_m , in voltage V_m at Full scale deflection is

- (a) $250\ \mu\text{V}$
- (b) $0.1\ \text{V}$
- (c) $0.2\ \text{V}$
- (d) $0.5\ \text{V}$

Ans: (b)

1966. Voltmeter sensitivity is defined by:

- (a) V/Ω
- (b) V/Ω^2
- (c) Ω/V
- (d) Ω/V^2

Ans: (c)

1967. When the DC voltmeter is connected polarities reversed

- (a) The pointer deflects upscale
- (b) The pointer deflects downscale
- (c) The pointer remains stationary
- (d) None of these

Ans: (b)

1968. Ammeters are always connected in __

- (a) Series
- (b) Parallel
- (c) Either (a) or (b)
- (d) None of these

Ans: (a)

1969. An accurate voltmeter must have an internal impedance of

- (a) very low value
- (b) low value
- (c) very high value
- (d) zero

Ans: (c)

1970. A voltmeter must have a very high internal resistance so that the:

- (a) Accuracy is high
- (b) Resolution is high
- (c) Meter draws minimum current
- (d) Loading is maximum

Ans: (c)

1971. To convert a galvanometer into voltmeter, the value and type of connection of the resistance to be connected with should be

- (a) Low and parallel
- (b) High and parallel
- (c) Low and series
- (d) High and series

Ans: (d)

1972. Two ammeters A and B both 0-10 A have internal resistance of 1Ω and 0.5Ω respectively.

They are connected in parallel. If total current is 15 A, then

- (a) $I_A = I_B = 7.5\text{ A}$
- (b) $I_A = 5\text{ A}, I_B = 10\text{ A}$
- (c) $I_A = 10\text{ A}, I_B = 5\text{ A}$
- (d) $I_A = 9\text{ A}, I_B = 6\text{ A}$

Ans: (b)

1973. The resistance of a voltmeter and Ammeter is Respectively

- (a) Low and High
- (b) High and High
- (c) High and Low
- (d) Low and Low

Ans: (c)

1974. A 0-15 V voltmeter has a resistance of 1000Ω , if it is desired to expand its range to 0-150 V a resistance of _____ is connected in series with it.

- (a) $3\text{ k}\Omega$
- (b) $5\text{ k}\Omega$
- (c) $9\text{ k}\Omega$
- (d) $2\text{ k}\Omega$

Ans: (c)

1975. The internal resistance of a voltmeter is 20,000 ohms. If this voltmeter is connected in series with a resistance and a 220 volt supply is connected across the combination, the voltmeter reads 200 volts. The value of the resistance is

- (a) 200Ω
- (b) 4000Ω
- (c) 2000Ω
- (d) $20,000\Omega$

Ans: (c)

1976. What will happen if a voltmeter is connected like an ammeter in series of the load?

- (a) The meter will burn out
- (b) The measurement will be too high
- (c) The same current will flow as would have been with ammeter in circuit
- (d) There will be almost no current in the circuit

Ans: (d)

1977. Internal resistance of an ideal ammeter is-

- (a) Zero
- (b) Infinite
- (c) Small
- (d) Big

Ans: (a)

1978. A voltmeter is used

- (a) To measure current
- (b) In series with the circuit
- (c) In parallel with the circuit
- (d) To measure coulombs

Ans: (c)

1979. 184. A 10 mA ammeter has a resistance of 50 ohms. It is to be converted to a 1A ammeter. The value of shunt resistance should be :

- (a) 5Ω
- (b) 0.1Ω
- (c) 0.505Ω
- (d) 0.05Ω

Ans: (c)

1980. Which one of the following is used to measure direct current?

- (a) Voltmeter
- (b) Ammeter
- (c) Pyrometer
- (d) Coupler

Ans: (b)

1981. A galvanometer (G) measures upto 100 mA current. It is to be converted to voltmeter to measure upto 100 volts. What is required to be done?

- (a) Add 100Ω resistance in series with G
- (b) Add 1000Ω resistance in series with G
- (c) Add 1Ω resistance in parallel with G
- (d) Add 0.1Ω resistance in parallel with G

Ans: (b)

1982. Assertion (A): Shunt of an ammeter has a low resistance. Reason (R): Shunt may be connected in series or in parallel with ammeter

- (a) Both A and R are true and R is correct explanation of A
- (b) Both A and R are true, but R is not correct explanation of A
- (c) A is true, R is false
- (d) A is false, R is true

Ans: (c)

1983. The internal resistance of the milliammeter must be very low for

- (a) High accuracy
- (b) High sensitivity
- (c) Minimum effect on the current in the circuit
- (d) Maximum voltage drop across the meter

Ans: c

1984. A precision current shunt is measuring 200 mV across it and also indicates a current of 30 A. What is the actual resistance of this shunt?

- (a) 0.006Ω
- (b) 0.3Ω
- (c) 30Ω
- (d) 6Ω

Ans: (a)

1985. The value of resistance in a potential divider arrangement to convert a basic d Arsonval meter movement with an internal resistance of 100Ω a full scale current of 1 mA to a multi- range DC voltmeter with ranges 0-150 V and 0-300 V are:

- (a) 149.5 k Ω , 155.5 k Ω
- (b) 144.9 k Ω , 140 k Ω
- (c) 135.5 k Ω , 134 k Ω
- (d) 149.9 k Ω , 150 k Ω

Ans: (d)

1986. The operating magnetic field in an electrodynamic meter type of instrument has a flux density typically about

- (a) 1 Wb/m²
- (b) 0.5 Wb/m²
- (c) 0.05 Wb/m²
- (d) 0.005 Wb/m²

Ans: (d)

1987. In a single phase induction meter, in order to obtain true value of energy, the shunt magnetic flux should lag behind the applied voltage by

- (a) 0°
- (b) 45°
- (c) 90°
- (d) 180°

Ans: (c)

1988. Laboratory wattmeters are:

- (a) Induction type
- (b) Moving type
- (c) Electrostatic type
- (d) Electrodynamometer type

Ans: (d)

1989. In two wattmeter method of measurement of three-phase power of a balanced load, if both wattmeters indicate the same reading then the power factor of the load is

- (a) 0.5 lagging
- (b) Less than 0.5 lagging
- (c) Unity
- (d) Greater than 0.5 lagging

Ans: c

1990. In two wattmeter method of 3-phase power measurements, when the power factor is 0.5

- (a) The readings of the two wattmeters are equal and positive
- (b) The readings of the two wattmeters are equal and opposite
- (c) The total power is measured by only one wattmeter
- (d) The readings of the

Ans: (c)

1991. In a dynamometer wattmeter, the moving coil is the

- (a) Current coil
- (b) Low p.f. coil
- (c) Potential coil
- (d) Compensating coil

Ans: (c)

1992. It is required to measure pf of an electrical load. No power factor meter is available. The following combination is used to determine pf

- (a) A wattmeter
- (b) A voltmeter and ammeter
- (c) A voltmeter, ammeter and wattmeter
- (d) A kWh meter

Ans: (c)

1993. Electrolytic meter is basically a/an

- (a) DC ampere-hour meter
- (b) DC watt hour meter
- (c) AC energy meter
- (d) AC ampere-hour meter

Ans: (a)

1994. The minimum number of wattmeter(s) required to measure 3-phase, 3-wire balanced or unbalanced power is

- (a) 1
- (b) 2
- (c) 3
- (d) 4

Ans: (b)

1995. In the two-wattmeter method of 3-phase power measurement of a balanced load, one of the wattmeters reads negative. It may be concluded that the p .f. of the load is

- (a) Zero
- (b) 0.5
- (c) Less than 0.5
- (d) Greater than 0.5

Ans: c

1996. The minimum number of wattmeters required to measure 3-phase power is

- (a) 0
- (b) 2
- (c) 4
- (d) 3

Ans: (b)

1997. The functioning of compensating winding in the dynamometer type wattmeter is to neutralize the error due to

- (a) Voltage in the pressure coil circuit
- (b) Power loss in the pressure coil circuit
- (c) The current in the current coil circuit
- (d) Power loss in the current coil circuit

Ans: (b)

1998. Creep occurs in 1Φ energy meters when is energized and it is mainly because of for friction.

- (a) Current-coil, over-compensation
- (b) Pressure-coil, over-compensation
- (c) Pressure-coil, under-compensation
- (d) Current-coil, under-compensation

Ans: (b)

1999. Creeping in energy meters can be prevented by

- (a) Using extra turns of the voltage coils
- (b) Having two holes on opposite sides of the disc
- (c) Using a stronger brake magnet
- (d) Using steel laminations of high permeability

Ans: (b)

2000. Two wattmeters connected to measure the power in a 3-phase balanced delta connected load read $W_1=12$ kW and $W_2=15$ kW respectively. If the same load is reconnected in star, then the wattmeters would read

- (a) $W_1 = 8.66$ kW, $W_2 = 6.93$ kW
- (b) $W_1 = 6.93$ kW, $W_2 = 8.66$ kW
- (c) $W_1 = 5$ kW, $W_2 = 4$ kW
- (d) $W_1 = 4$ kW, $W_2 = 5$ Kw

Ans: (d)

2001. One of the two wattmeters has read zero in the two -wattmeters method of power measurement. This indicated that the load p.f. angle is

- (a) 0°
- (b) 30°
- (c) 60°
- (d) 90°

Ans: (c)

2002. If an induction type energy meter runs fast, it can be slowed down by adjusting the

- (a) Lag
- (b) Light load
- (c) Position of braking magnet and making it move closer to the center of the disc
- (d) Position of braking magnet and making it move away from the center of the disc

Ans: (d)

2003. In a low power-factor wattmeter, compensating coil is employed in order to

- (a) Neutralize the capacitance effect of pressure coil
- (b) Compensate for the inductance of pressure coil
- (c) Compensate for the error caused by power loss in the pressure coil
- (d) Reduce the error caused by the eddy currents

Ans: (c)

2004. Which one of the following causes the disc in an induction type of energy meter to rotate in the opposite direction?

- (a) The braking magnet is faulty
- (b) Both current coil and voltage coil are wrongly connected
- (c) Either current coil or voltage coil is wrongly connected
- (d) The load is highly reactive

Ans: (c)

2005. In the case of power measurement by the watt meter method in a balanced three phase system with a pure inductive load.

- (a) Both the wattmeters will indicate the same value but of opposite sign
- (b) Both the wattmeters will indicate zero
- (c) Both the wattmeters will indicate the same value and of the same sign
- (d) One the wattmeters will indicate zero and the other show non-zero value

Ans: (a)

2006. The current and potential coils of a wattmeter were accidentally interchanged while connecting. After energizing the circuit it was observed that the wattmeter did not show the reading. What could this be due to

- (a) Damage to potential coils only
- (b) Damage to current coils only
- (c) Damage to both potential and current coils
- (d) Losses contact

Ans: (b)

2007. A wattmeter will read zero under the following condition

- (a) The voltage and current are exactly in phase
- (b) The voltage and current have the same time periods but the voltage is sinusoidal whereas the current is a square wave
- (c) The voltage frequency is twice the current frequency
- (d) The current is DC and the voltage is sinusoidal

Ans: (d)

2008. The phenomena of 'creeping' occurs in

- (a) Ammeters
- (b) Voltmeters
- (c) Wattmeters
- (d) Watt-hour meters

Ans: (d)

2009. In a single-phase power factor meter, the controlling torque is

- (a) Provided by spring control
- (b) Provided by gravity control
- (c) Provided by stiffness of suspension
- (d) Not required

Ans: (d)

2010. In an electrodynamicometer type wattmeter, the inductance of the pressure coil produces error. The error is

- (a) Constant irrespective of the power factor of the load
- (b) Higher at higher power factor loads
- (c) Higher at lower power factor loads
- (d) Highest at unity power factor loads

Ans: (c)

2011. The moving coil in a dynamometer wattmeter is connected

- (a) In series with the fixed coil
- (b) Across the supply
- (c) In series with the load
- (d) Across the load

Ans: (b)

2012. Which one of the following defects is responsible for creeping in an induction type energy meter?

- (a) Imperfect lag compensation
- (b) Over friction compensation
- (c) Imperfect overload compensation
- (d) Misalignment of brake magnet

Ans: (b)

2013. The voltage coil of a single-phase house service energy meter

- (a) Is highly resistive
- (b) Is highly inductive
- (c) Is highly capacitive
- (d) Has a phase angle equal to load power factor angle

Ans: (b)

2014. The creeping is observed in

- (a) Arnmeter
- (b) Wattmeter
- (c) Energy meter
- (d) Volt meter

Ans: (c)

2015. The pressure coil of an induction type energy meter is

- (a) Highly resistive
- (b) Highly inductive
- (c) Purely resistive
- (d) Purely inductive

Ans: (b)

2016. A dynamometer type wattmeter responds to the

- (a) Average value of active power
- (b) Average value of reactive power
- (c) Peak value of active power
- (d) Peak value of reactive power

Ans: (a)

2017. Holes are drilled on the opposite side of the disc of an induction type energy meter to

- (a) Avoid creep on no load
- (b) Balance the disc
- (c) Dissipate heat energy due to eddy currents
- (d) Increase the deflecting torque

Ans: (a)

2018. In calibration of a dynamometer Wattmeter by potentiometer, phantom loading arrangement is used because

- (a) The arrangement gives accurate results
- (b) The power consumed in calibration work is minimum
- (c) The method gives quick results
- (d) The onsite calibration is possible

Ans: (b)

2019. An energy-meter having a meter constant of 1200 revolutions per kWh is found to make 5 revolutions in 75s. The load power is

- (a) 500 W
- (b) 100 W
- (c) 200 W
- (d) 1000 W

Ans: c

2020. The instantaneous voltage and current across a load is given by $v = 50 \sin(314t - \pi/6)$ volts and $i = 10 \sin(314t - \pi/2)$ amperes, respectively. The active power consumed by the load is:

- (a) 500 watts
- (b) 125 watts
- (c) 1000 watts
- (d) None of these

Ans: (b)

2021. Power consumed by a balanced 3-phase, 3-wire load is measured by two wattmeter method. The first wattmeter reads twice that of the second. Then what will be the load impedance angle in radian?

$(\pi/6)$

- (a) $(\pi/3)$
- (b) $(\pi/2)$
- (c) $(\pi/4)$

Ans: (a)

2022. For power measurement of three phase circuit by two wattmeter method, when the value of power factor is less than 0.5 lagging:

- (a) One of the wattmeters will read zero
- (b) Both give the same readings
- (c) One of the wattmeter connections will have to be reversed
- (d) Pressure coil of the wattmeter will become ineffective

Ans: (c)

2023. In two watt meter method of 3 phase power measurement when does one watt meter read negative?

- (a) When power factor is unity
- (b) When power factor is 0.5
- (c) When power factor is less than 0.5
- (d) When power factor is greater than 0.5 and less-than unity

Ans: (c)

2024. A single phase energy meter is operating on 200 V, 50 Hz supply with a load of 10A for two hours at 0.8 p.f The meter takes 1800 revolutions in that period. The meter constant is:

- (a) 1800 rev/kWh
- (b) 900 rev/kWh
- (c) 1000 rev/kWh
- (d) 562 rev/kWh

Ans: (d)

2025. In a single phase induction type energy meter, the deflecting torque is the true power in the circuit.

- (a) Proportional to
- (b) Equal to
- (c) Greater than
- (d) Less than

Ans: (a)

2026. Single or One Wattmeter Method can only be used for ---

- (a) Balanced three-phase load
- (b) Imbalanced two-phase load
- (c) Balanced one-phase load
- (d) Imbalanced one-phase load

Ans: (a)

2027. In a single phase Dynamometer Wattmeter, the instantaneous torque has a component of power which varies as the frequency of current and voltage.

- (a) Twice
- (b) Half
- (c) Four times
- (d) Three times

Ans: (a)

2028. According to Blondel's theorem, if a network is supplied using 'n' conductors, the total power is the ___ of the reading of n wattmeters so arranged that a current coil of each wattmeter is in each line and the corresponding pressure coil is connected between that line and a common point.

- (a) Sum
- (b) Product
- (c) Sum of products of two wattmeter's reading taken together
- (d) Difference

Ans: (a)

2029. Calculate the percentage error for a wattmeter which is so connected that the current coil is on the load side. The wattmeter has a current coil of 0.03Ω resistance and a pressure coil of 6000Ω resistance. It is also known that the load takes 20A at a voltage of 220 V and 0.6 power factor.

- (a) 0.45%
- (b) 45%
- (c) 5.5%
- (d) 6.5%

Ans: (a)

2030. The power of system, three-phase 10kVA load with a power factor of 0.342, is measured by two-wattmeter method. The readings of two wattmeters are W 1 and W 2. What can be said about these readings?

- (a) When power factor is changed from lagging to leading, the readings of W 1 and W 2 INcrease.
- (b) When power factor is changed from lagging to leading, the readings of W 1 and W 2 get interchanged.
- (c) When power factor is changed from lagging to leading, the readings of W 1 and W 2 decrease.
- (d) When power factor is changed from lagging to leading, the readings of W 1 and W 2 attain negative sign always.

Ans: (b)

2031. The type of wattmeter commonly used for measurement of power in AC circuits is:

- (a) Moving iron type
- (b) Thermocouple type
- (c) Rectifier type
- (d) Dynamometer type

Ans: (d)

2032. Induction type energy meter measures energy in

- (a) Joules
- (b) Kw
- (c) kWh
- (d) kW.s

Ans: (c)

2033. Two wattmeter method can be used to measure the total power delivered to:

- (a) Star connected with neutral loads
- (b) Delta connected load only
- (c) Star connected load only
- (d) Star as well as delta connected loads

Ans: (d)

2034. The pressure coil of a wattmeter consists of:

- (a) More number of turns of fine wire
- (b) Less number of turns of fine wire
- (c) Less number of turns of thick wire
- (d) More number of turns of thick wire

Ans: (a)

2035. Household energy meter falls under category of which type of instrument?

- (a) A magnetically revolving type instrument
- (b) A recording instrument
- (c) A displaying instrument
- (d) An integrating instrument

Ans: (d)

2036. Energy meter runs slowly even if power is not used. This error is called

- (a) Speed error
- (b) Phase error
- (c) Creeping error
- (d) None of these

Ans: (c)

2037. While measuring power in a three phase load by two wattmeter method, the reading of two wattmeter are equal and opposite, when

- (a) Load is balanced
- (b) Power factor is unity
- (c) Phase angle is between 60° to 90°
- (d) The load is purely inductive

Ans: (d)

2038. If a dynamometer wattmeter is connected in an ac circuit, the power indicated by the wattmeter will be

- (a) Volt-ampere product
- (b) Average power
- (c) Peak power
- (d) Instantaneous power

Ans: (b)

2039. A compensated wattmeter has its reading corrected for error due to

- (a) Frequency
- (b) Friction
- (c) Power consumed in current coil
- (d) Power consumed in pressure coil

Ans: (d)

2040. The disc of domestic supply energy meter is made of which material ?

- (a) Zinc
- (b) Copper
- (c) Aluminium
- (d) Silver

Ans: (c)

2041. In induction wattmeters, the instantaneous value of deflecting torque is voltage under measurement.

- (a) Directly proportional
- (b) Inversely proportional
- (c) Directly proportional to the square of
- (d) Inversely proportional to the square of

Ans: (c)

2042. In energy meter, if brake magnet is moved away from the spindle of the moving disc, the aluminium disc.

- (a) Will run fast
- (b) No effect
- (c) Will run slow
- (d) Will come to a stop

Ans: (c)

2043. Ampere-Hour meter (DC) is rated for 20A, 250 V The meter constant is 15 A-sec/rev. The meter constant at rated voltage may be expressed as:

- (a) 3750 rev/kWh
- (b) 3600 rev/kWh
- (c) 1000 rev/kWh
- (d) 960 rev/kWh

Ans: (d)

2044. Calculate the power factor for a 3 phase load measuring 2 kW and 1 kW by using the 2 wattmeter method.

- (a) 0.824
- (b) 0.842
- (c) 0.866
- (d) 0.91

Ans: (c)

2045. To measure the total power on a three-phase system supplying a balanced load, two wattmeters reads 7.5 kW and -1.5 kW, respectively. The total power and the power factor, respectively, are:

- (a) 13.0 kW, 0.334
- (b) 5.0 kW, 0.684
- (c) 8.0 kW, 0.52
- (d) 6.0 kW, 0.359

Ans: (d)

2046. An electrodynamicometer type of instruments finds its major use as

- (a) Standard instrument only
- (b) Transfer instrument only
- (c) Both as or standard and transfer instruments
- (d) An indicator type of instrument

Ans: (c)

2047. Dynamometer type of instrument can use in:

- (a) AC
- (b) DC
- (c) AC and DC
- (d) Pulsating

Ans: (c)

2048. Which of the following instruments is equally accurate on AC as well as DC circuits?

- (a) PMMC voltmeter
- (b) Dynamometer wattmeter
- (c) Moving iron ammeter
- (d) Induction wattmeter

Ans: (b)

2049. A wattmeter reads 25.34 W. The absolute error in measurement is -0.11 W. What is the true value of power?

- (a) 25.23 W
- (b) 25.45 W
- (c) -25.23 W
- (d) -24.45 W

Ans: (b)

2050. Watt-hour instrument is the type of

- (a) Indicating
- (b) Integrating
- (c) Recording
- (d) None of the above

Ans: (b)

2051. Induction type instrument are used in

- (a) AC
- (b) DC
- (c) Both
- (d) None of the above

Ans: (a)

2052. The correct statement about Electrodynamometer instrument amongst the following is :

- (a) Its scale is linear
- (b) It measures only DC
- (c) It is a transfer instrument
- (d) Its sensitivity is lesser than MI type

Ans: (c)

2053. A Dynamo works on the principle of _____

- (a) Supercharging
- (b) Electromagnetic induction
- (c) Alternating current
- (d) Kirchoff's Law

Ans: (b)

2054. A volt meter has resistance of 2000Ω , when it is connected across a d.c. circuit its power consumption is 2 mW. Suppose this voltmeter is replaced by a voltmeter of 4000Ω resistance the power consumption will be

- (a) 4 mW
- (b) 1 mW
- (c) 2 mW
- (d) none of these

Ans: (b)

2055. The Energy provided by Ideal voltage source when the load is open circuit

- (a) Zero
- (b) Infinite
- (c) Unity
- (d) Not specific

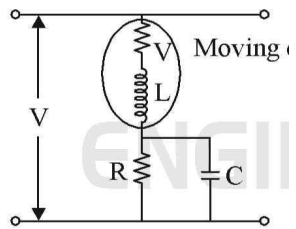
Ans: (a)

2056. The active and apparent power in an inductive circuit are 60 kW and 100 kVA respectively. The power factor of the circuit is:

- (a) 0.6 leading
- (c) 0.5 lagging
- (b) 0.6 lagging
- (d) 0.75 lagging

Ans: (b)

2057. The purpose of capacitor in the moving coil instrument figure is:



- (a) To compensate for the error due to supply variation
- (b) To bypass the resistor R
- (c) To compensate for error due to inductance of pressure coil.
- (d) To increase the impedance

Ans: (c)

2058. Which type of wattmeter can not be used for both AC and DC?

- (a) Dynamometer type
- (b) Electrostatic type
- (c) Induction type
- (d) None of the above

Ans: c

2059. In the two wattmeter method of measuring 3 phase power, the wattmeter indicated equal and opposite readings when load power factor is-

- (a) 90° leading
- (b) 90° lagging
- (c) 30° leading
- (d) 30° lagging

Ans: (b)

2060. Measurement of power of a 3-phase balanced load is done using two wattmeter method. If the ratio of the wattmeter readings is 2 : 1 then power factor of the circuit will be

- (a) 0.0
- (c) 0.5
- (b) 1.0
- (d) 0.866

Ans: (d)

- 2061.** The pressure coil of a wattmeter should be supply side of the current coil when ____
- (a) Supply voltage is low
 - (b) Supply voltage is high
 - (c) Load impedance is low
 - (d) Load impedance is high

Ans: (d)

- 2062.** The pressure coil of a dynamometer type wattmeter is
- (a) Highly inductive
 - (b) Highly resistive
 - (c) Purely resistive
 - (d) Purely inductive

Ans: (b)

- 2063.** Two wattmeter method for measuring power factor is used for
- (a) Balanced load only
 - (b) Balanced and unbalanced loads
 - (c) Unbalanced load only
 - (d) Star connected balanced load only

Ans: (b)

- 2064.** In a 3-phase, 3-wire unbalanced load, power cannot be measured by two wattmeters
- (a) True
 - (b) False
 - (c) Cannot be said
 - (d) None of these

Ans: (b)

- 2065.** In a balanced 3-phase 400 V circuit, the line current is 115.5 A when the power is measured by two wattmeter method, one meter reads 40 kW and the other zero. What is the power factor of the load
- (a) 1
 - (b) 0.5
 - (c) 0.6
 - (d) 0.8

Ans: (b)

- 2066.** The power of a n-phase circuit can be measured by using a minimum of
- (a) n elements
 - (b) 2n wattmeter elements
 - (c) (n-1) wattmeter element
 - (d) (n+1) wattmeter element

Ans: (c)

2067. In an electrodynamicometer type wattmeter:

- (a) The current coil is made fixed
- (b) The pressure coil is fixed
- (c) Both the coil are fixed
- (d) Both the coils are movable

Ans: (a)

2068. In a single phase induction type wattmeter, a meter can be reversed by

- (a) Reversing either the potential coil terminal or current coil terminals
- (b) Reversing connections of both current and potential coil circuits
- (c) Reversing the supply terminals
- (d) Reversing the load terminals

Ans: (a)

2069. One single phase wattmeter operating on 230 V and 5 A for 5 hours makes 1940 revolutions. Meter constant in Rev/kWh is 400. The power factor of the load will be:

- (a) 1
- (b) 0.84
- (c) 0.7
- (d) 0.6

Ans: (b)

2070. In an electrodynamicometer type wattmeter if the voltage and current measured are given by $V=100 \sin 314t$ and $i=10 \sin (314t-60^\circ)$ respectively, the reading (in watts) will be

- (a) 1000
- (c) 250
- (b) 500
- (d) 433

Ans: c

2071. How many coils are there in a wattmeter?

- (a) 2
- (b) 3
- (c) 4
- (d) 1

Ans: (a)

2072. The power in an unbalance 3-phase 4-wire circuit can be measured by using a method

- (a) 4 wattmeter
- (b) 3 wattmeter
- (c) 2 wattmeter
- (d) 1 wattmeter

Ans: (b)

- 2073.** In dynamometer wattmeter the compensation coil
- (a) Has equal number of turns of voltage coil and is connected in series with current coil
 - (b) Has equal number of turns of current coil and is connected in series with voltage coil
 - (c) Has equal number of turns of current coil and is connected in series with current coil
 - (d) Has equal number of turns of voltage coil and is connected in series with voltage coil

Ans: (b)

- 2074.** A single phase 230 V energy meter has a constant load of 5 A passing through it for 6 hours at unity p.f. If the meter disc makes 2070 revolutions during this period. What is the meter constant in revolutions per unit?

- (a) 100 rev/unit
- (b) 200 rev/unit
- (c) 300 rev/unit
- (d) 400 rev/unit

Ans: (c)

- 2075.** An energy meter is designed to make 100 revolution for one unit of energy. Calculate the number of revolutions made by it when connected to load carrying 50 A at 230 V and 0.6 pf an hour :

- (a) 575 revolutions
- (b) 1150 revolutions
- (c) 920 revolutions
- (d) 690 revolutions

Ans: (d)

- 2076.** An energy meter is designed to make 100 revolutions for one unit of energy. The number of revolutions when connected to a load of 40 A, at 230 V and 0.95 power factor lagging for an hours is :

- (a) 657
- (c) 362
- (b) 874
- (d) 530

Ans: (b)

- 2077.** Copper shading is provided in energy meter to

- (a) Bring flux exactly in quadrature with applied voltage
- (b) To increase speed of aluminium disc
- (c) To count the rotation
- (d) To balance the system from vibration

Ans: (a)

2078. A single phase energy meter has a constant of 1200 revolution/kWh. When a load of 200 W is connected, the disc rotates at 4.2 revolutions per min. If the load is on for 10 hours, the meter records an excess of

- (a) 0.1 kWh
- (c) 1.0 kWh
- (b) 0.2 kWh
- (d) 2.1 kWh

Ans: (a)

2079. The energy meter installed at a residence charges the consumer for use of:

- (a) Apparent power
- (b) True power
- (c) Reactive power
- (d) Product of voltage and current

Ans: (b)

2080. In an LVDT, the core is made up of a

- (a) Magnetic material
- (b) Non-magnetic material
- (c) High permeability nickel - iron hydrogen annealed material
- (d) Low permeability nickel iron hydrogen annealed

Ans: (c)

2081. Time base generators used in CRO produces waveforms

- (a) Sine
- (b) Square
- (c) Sweep
- (d) Pulse

Ans: (c)

2082. CRO probe assembly is an application of

- (a) Multi vibrator
- (b) Attenuator
- (c) Clipper
- (d) Clamper

Ans: (b)

2083. The Lissajous pattern on the screen of a CRO is an ellipse with major axis in quadrant 2 and quadrant 4. Then the phase difference between two signals can be

- (a) 270°
- (b) 210°
- (c) 180°
- (d) 300°

Ans: (b)

2084. Q-meter works on the principal of

- (a) Series resonance
- (b) Parallel resonance
- (c) Mutual inductance
- (d) Self inductance

Ans: (a)

2085. A sinusoidal waveform, when observed on an oscilloscope has a peak to peak amplitude of 6 cm. If the vertical sensitivity setting is 5 V/cm, the rms value of the voltage is

- (a) 10.6 V
- (b) 11.1 V
- (c) 12.6 V
- (d) 15 V

Ans: (a)

2086. Assertion (A): Vertical deflection sensitivity of a CRO is higher than that of the horizontal system. Reason (R): Sweep voltage is applied to the horizontal deflecting plates.

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true but R is not a correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

Ans: (a)

2087. When 30 V DC is applied to the vertical deflecting plates of a cathode ray tube, the bright spot moves 1 cm away from the centre. If 30 V (rms) AC is applied, then the movement of the spot will be nearly

- (a) 1 cm
- (b) 1.5 cm
- (c) 2 cm
- (d) 3 cm

Ans: (a)

2088. In measuring the distributed capacitance of a certain coil using Q-meter, initial resonance at frequency 2 MHz is obtained by tuning the capacitance set to 430 pF. If resonance at 4 MHz is obtained by tuning the capacitance set to 100 pF, then the value of would be

- (a) 10 pF
- (b) 20 pF
- (c) 100 pF
- (d) 200 pF

Ans: (a)

2089. Assertion (A): The screen of the CRT is coated with phosphor on the inside. Reason (R): phosphor absorbs the kinetic energy of the bombarding electrons and re-emits energy at a frequency in the visible region.

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true but R is not a correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

Ans: (a)

2090. The purpose of applying post deflection potential is

- (a) To increase deflection sensitivity
- (b) To speed up the electrons
- (c) To increase the brightness of the spot
- (d) To keep deflection angle unchanged

Ans: c

2091. The y input of a CRO a signal defined by $10 \sin 100 t$ is applied. The x input, the signal $10 \cos 100 t$ is fed. The gain for both x channels and any y channel is the same. The screen shows

- (a) Sinusoidal signal
- (b) A straight line
- (c) An ellipse
- (d) A circle

Ans: (d)

2092. Which meter is suitable for the measurement of 10 mV at 50 MHz ?

- (a) Moving iron voltmeter
- (b) VTVM
- (c) Electrostatic Voltmeter
- (d) CRO

Ans: (d)

2093. What is the range for a $3\frac{1}{2}$ digital meter?

- (a) 0 to 1999
- (b) 0 to 1500
- (c) 0 to 999
- (d) 0 to 19999

Ans: (a)

2094. The circuit generally used in digital instruments to convert sine waves into rectangular pulses is a

- (a) Sawtooth generator
- (b) Differential amplifier
- (c) Sample and hold circuit
- (d) Schmitt trigger

Ans: (d)

2095. A certain oscilloscope with 4 cm x 4 cm screen has its own sweep output fed to its input. If the x and y sensitivities are same, the oscilloscope will display a

- (a) Triangular wave
- (b) Diagonal line
- (c) Sine wave
- (d) Circle

Ans: (b)

2096. The battery cells in an electronic multimeter are required to measure which one of the following?

- (a) Resistance
- (b) Voltage
- (c) Current
- (d) Power

Ans: (a)

2097. Modern electronic multimeter measure resistance by

- (a) Using a bridge circuit
- (b) Using an electronic bridge compensator for nulling
- (c) Forcing a constant current and measuring the voltage across the unknown resistor
- (d) Applying a constant voltage and measuring the current through the unknown resistor

Ans: (c)

2098. In a Q-meter measurement to determine the selfcapacitance of a coil, the first resonance occurred at f_1 with $C_1 = 300$ pF. The second resonance occurred at $f_2 = 2f_1$ with $C_2 = 60$ pF.

The self capacitance of coil works out to be

- (a) 240 pF
- (b) 60 pF
- (c) 360 pF
- (d) 20 pF

Ans: (d)

2099. The input impedance of CRO is nearly

- (a) Zero
- (b) Around 10 ohms
- (c) Around 100 ohms
- (d) Around one mega ohm

Ans: (d)

2100. A signal of 10 mV at 75 MHz is to be measured. Which of the following instruments can be used?

- (a) VTVM
- (b) Cathode ray oscilloscope
- (c) Moving iron voltmeter
- (d) Digital multimeter

Ans: (b)

2101. LVDT is a:

- (a) Displacement transducer
- (b) Velocity transducer
- (c) Acceleration transducer
- (d) Pressure transducer

Ans: (a)

2102. Semiconductor strain gauges depend upon _____ for their action.

- (a) Piezo electric effect
- (b) Piezo resistive effect
- (c) Hall's effect
- (d) Superconductivity

Ans: (b)

2103. Transducers may not be called as:

- (a) Gauges
- (b) Pickups
- (c) Signal generators
- (d) Amplifiers

Ans: (d)

2104. LVDT can not measure:

- (a) Weight
- (b) Pressure
- (c) Acceleration
- (d) Temperature

Ans: (d)

2105. Which gauge is used to measure the thickness of sheet?

- (a) Wire gauge
- (b) Sheet gauge
- (c) Feeler gauge
- (d) Pitch gauge

Ans: (b)

2106. The stroboscope is used to measure?

- (a) Displacement speed
- (b) Pressure
- (c) Speed
- (d) Temperature

Ans: (c)

2107. Load cell essentially is a

- (a) Thermistor
- (b) Strain gauge
- (c) Photo voltaic cell
- (d) Photo diode

Ans: (b)

2108. Solar beam radiation is measured using

- (a) Anemometer
- (b) Thermometer
- (c) Sunshine
- (d) Pyrheliometer Recorder

Ans: (d)

2109. A thermo-couple ammeter/voltmeter has

- (a) A logarithmic law response
- (b) A square law response
- (c) A linear law response
- (d) None of these

Ans: (b)

2110. A thermopile is-

- (a) Used to detect thermal radiation
- (b) Used to measure heating effect of electric current
- (c) A number of thermo-couples joined in parallel
- (d) Both (a) & (b)

Ans: (c)

2111. The operation of a Thermocouple is based on:

- (a) Thomson effect
- (b) Seebeck effect
- (c) Peltier effect
- (d) Faraday's laws

Ans: (b)

2112. The output of a thermo-couple is

- (a) DC current
- (b) DC voltage
- (c) AC current
- (d) AC voltage

Ans: (b)

2113. Which of the following instruments is exclusively used for measuring radio frequency currents?

- (a) Moving iron
- (b) Thermocouple
- (c) PMMC
- (d) Electrodynamic

Ans: (b)

2114. Electrolytic meter is basically a/an

- (a) DC ampere-hour meter
- (b) DC watt hour meter
- (c) AC energy meter
- (d) AC ampere-hour meter

Ans: (a)

2115. Thermistor is employed for measurement of

- (a) Linear displacement
- (b) Acceleration
- (c) Pressure
- (d) Temperature

Ans: (d)

2116. The emf developed by a thermocouple depends upon.

- (a) Length of wires and temperature difference at two ends
- (b) Material used, temperature of hot and cold junctions
- (c) Material used, diameter of wires and temperature gradient
- (d) Material used, shape and size of materials and temperature difference

Ans: (b)

2117. Which of these instruments has highest power consumption?

- (a) Dynamometer
- (b) Electrostatic
- (c) Moving coil
- (d) Hot Wire

Ans: (d)

2118. The sweep generator of a CRO is used to produce:

- (a) Sinusoidal voltage for the vertical deflection of electron beam
- (b) Saw tooth voltage for the horizontal deflection of electron beam
- (c) Saw tooth voltage for the vertical deflection of electron beam
- (d) Sinusoidal voltage for the horizontal deflection of electron beam

Ans: (b)

2119. A Lissajous pattern on an oscilloscope has 5 horizontal tangencies and 2 vertical tangencies. The frequency of the horizontal input is 1000 Hz. What is the frequency of the vertical input?

- (a) 400 Hz
- (b) 5000 Hz
- (c) 4000 Hz
- (d) 2500 Hz

Ans: (d)

2120. In CRT, the secondary electrons are collected by a conductive coating aquadag which is made up of -- .

- (a) Hydrazine solution
- (b) Zirconium solution
- (c) Graphite solution
- (d) Rubber

Ans: (c)

2121. The calibration signal available from CRO is of the form :

- (a) Sinusoidal wave
- (b) Square wave
- (c) Sawtooth wave
- (d) DC signal

Ans: (c)

2122. An Aquadag is used in a CRO to collect

- (a) Primary electrons
- (b) Secondary emission electrons
- (c) Both (a) and (b)
- (d) None of these

Ans: (b)

2123. The wave applied to X plates in a CRO, for obtaining trace of voltage wave, is

- (a) Sawtooth wave
- (b) Sinusoidal wave
- (c) Rectangular wave
- (d) Either (a) or (b)

Ans: (a)

2124. An inverse transducer converts

- (a) Electrical energy to any other form of energy
- (b) Electrical energy to light energy
- (c) Mechanical displacement into electrical
- (d) Electrical energy to mechanical form

Ans: (a)

2125. Synchro is

- (a) Probolic transducer
- (b) An angular position transducer
- (c) A synchronizing transducer
- (d) A variable transducer

Ans: (b)

2126. The transducer employed for measurement of angular displacement is

- (a) LVDT
- (c) Thermistor
- (b) Thermocouple
- (d) Circular potentiometer

Ans: (d)

SECTION - C

I. ELECTRONICS

2127. What is a photocell primarily used for?

- (a) Generating sound
- (b) Detecting light intensity**
- (c) Amplifying current
- (d) Storing electrical energy

2128. A photocell operates based on which effect?
- (a) Hall effect
 - (b) Thermoelectric effect
 - (c) **Photoelectric effect**
 - (d) Electromagnetic induction
2129. Which of the following is a correct use of photo sensors in CNC automation?
- (a) Tool wear detection
 - (b) **Workpiece presence verification**
 - (c) Motor speed control
 - (d) Spindle alignment
2130. Which of the following is *not* an application of photocells?
- (a) Smoke detection
 - (b) TV remote control
 - (c) Automatic street lights
 - (d) **Audio amplification**
2131. The output of a photocell is generally
- (a) AC voltage
 - (b) **DC voltage**
 - (c) Magnetic field
 - (d) Sound wave
2132. When photo electric based sensor used for part detection of false detection is mainly due to
- (a) Mounting position (line of sight)
 - (b) Ambient light immunity (to avoid false signals)
 - (c) Dirt/oil/Mud in reflector (For reflector type)
 - (d) **All of the above**
2133. Which of the following sensors is not a photoelectric sensor?
- (a) Through-beam
 - (b) Retro-reflective
 - (c) **Inductive proximity**
 - (d) Diffuse reflective
2134. What is the longest sensing range typically found in photoelectric sensors?
- (a) Diffuse type
 - (b) Retro-reflective
 - (c) **Through-beam**
 - (d) Capacitive

2135. When a photocell detects an axle in a CNC loading station, what type of signal is typically sent to the PLC?
- (a) Analog voltage
 - (b) PWM signal
 - (c) **Digital input (ON/OFF)**
 - (d) Sinusoidal wave
2136. Which of the following sensors is not a photoelectric sensor?
- (a) Through-beam
 - (b) Retro-reflective
 - (c) **Inductive proximity**
 - (d) Diffuse reflective
2137. What type of proximity sensor can detect both metallic and non-metallic objects?
- (a) Inductive
 - (b) **Capacitive**
 - (c) Magnetic
 - (d) Optical
2138. What is the typical range of an inductive proximity sensor?
- (a) 10–50 cm
 - (b) **1–10 mm**
 - (c) 1–2 meters
 - (d) Over 5 meters
2139. What happens when a metallic object enters the sensing field of an inductive proximity sensor?
- (a) Capacitance increases
 - (b) Frequency decreases
 - (c) Magnetic field strengthens
 - (d) **Eddy currents are induced, causing output signal**
2140. An inductive proximity switch works best with which of the following targets?
- (a) Wood
 - (b) Glass
 - (c) Aluminum
 - (d) **Steel**
2141. Which proximity switch uses the Doppler effect for object detection?
- (a) Inductive
 - (b) Capacitive
 - (c) **Ultrasonic**
 - (d) Magnetic

2142. Which sensor would be most suitable in a dusty environment for detecting metal objects?
- (a) Capacitive sensor
 - (b) **Inductive sensor**
 - (c) Optical sensor
 - (d) Magnetic sensor
2143. Which application typically uses an inductive proximity switch?
- (a) Detecting a plastic bottle on a conveyor
 - (b) **Counting metal parts in an assembly line**
 - (c) Measuring temperature in a furnace
 - (d) Detecting humidity in a chamber
2144. In SPM CNC machines, proximity switches are commonly used to:
- (a) Display cutting force
 - (b) **Detect tool position or home reference**
 - (c) Show RPM of spindle
 - (d) Display coolant temperature
2145. What happens in a CNC machine if a reference proximity switch fails during homing?
- (a) The program auto-skips to the next cycle
 - (b) **The machine may stop or alarm out**
 - (c) The switch gets bypassed
 - (d) Nothing; it keeps running normally
2146. Which PLC instruction is commonly used to process a signal from a proximity switch?
- (a) PID
 - (b) MOV
 - (c) TON (Timer ON Delay)
 - (d) **XIC/XIO (Examine If Closed/Open)**
2147. In SPM machine, in Machine shop, inductive proximity switches are used in turrets for
- (a) Turret Zero position
 - (b) Tool lock & Unlock
 - (c) **Both A&B**
 - (d) None of these
2148. Proximity switches in CNC machines are preferred over mechanical limit switches because they:
- (a) Are cheaper
 - (b) **Work faster and have no contact wear**
 - (c) Require lubrication

- (d) Have analog output
- 2149. Which of the following can cause a proximity switch to give a false signal?
 - (a) Correct sensing distance
 - (b) Shielded cable
 - (c) **Electromagnetic interference (EMI)**
 - (d) Clean sensor face
- 2150. A capacitive proximity switch may malfunction if exposed to:
 - (a) Metal chips
 - (b) Dry air
 - (c) **High humidity or moisture**
 - (d) Stainless steel
- 2151. If the sensing face of an inductive proximity switch is covered with metal dust or chips, it can result in
 - (a) Improved detection
 - (b) Faster operation
 - (c) **Malfunction or false triggering**
 - (d) Increased range
- 2152. In CNC machines, what is commonly used to confirm the correct position after indexing?
 - (a) Temperature sensor
 - (b) Limit switch
 - (c) **Proximity switch or encoder**
 - (d) Pressure gauge
- 2153. In Machine shop Gantries, gripper is close & is confirmed by
 - (a) Proximity switch
 - (b) Pressure Switch
 - (c) **Both A&B**
 - (d) None of the above
- 2154. Which of the following devices allows current to flow only in one direction?
 - (a) Resistor
 - (b) Capacitor
 - (c) **Diode**
 - (d) Inductor
- 2155. The unit of capacitance is:
 - (a) Henry
 - (b) Ohm
 - (c) **Farad**
 - (d) Volt

2156. What is the function of a rectifier circuit?
- (a) Converts DC to AC
 - (b) Amplifies AC signal
 - (c) **Converts AC to DC**
 - (d) Stores energy
2157. In an RC circuit, the time constant (τ) is given by:
- (a) $R + C$
 - (b) **RC**
 - (c) R/C
 - (d) $1/RC$
2158. Which component stores energy in the form of a magnetic field?
- (a) Capacitor
 - (b) Resistor
 - (c) Diode
 - (d) **Inductor**
2159. The input and output of an ideal operational amplifier (op-amp) in an inverting configuration are:
- (a) In-phase
 - (b) **Out of phase by 180 degrees**
 - (c) Always zero
 - (d) Equal in magnitude
2160. The logic gate that outputs HIGH only when all inputs are HIGH is:
- (a) OR gate
 - (b) **AND gate**
 - (c) NAND gate
 - (d) NOR gate
2161. The purpose of a bypass capacitor in an amplifier circuit is to:
- (a) Reduce noise
 - (b) Stabilize voltage
 - (c) **Short AC signal to ground**
 - (d) Increase resistance
2162. In a full-wave bridge rectifier, the output frequency is:
- (a) Equal to the input AC frequency
 - (b) Half the input frequency
 - (c) **Twice the input frequency**
 - (d) Zero

2163. A Zener diode is used in electronic circuits primarily for:
- (a) Rectification
 - (b) Amplification
 - (c) **Voltage regulation**
 - (d) Oscillation
2164. What is the function of a coupling capacitor in amplifier circuits?
- (a) To store energy
 - (b) **To block DC and allow AC to pass**
 - (c) To increase gain
 - (d) To short circuit the input
2165. The current gain (β) of a BJT is defined as:
- (a) I_E / I_C
 - (b) **I_C / I_B**
 - (c) V_{CE} / V_{BE}
 - (d) I_B / I_C
2166. Which type of feedback is generally used in amplifier circuits for stability and reduced distortion?
- (a) Positive feedback
 - (b) **Negative feedback**
 - (c) Regenerative feedback
 - (d) Current feedback
2167. In an ideal op-amp, the input impedance is:
- (a) Zero
 - (b) Very low
 - (c) **Very high (ideally infinite)**
 - (d) Equal to output impedance
2168. Which configuration of a BJT gives the highest input impedance?
- (a) Common Emitter
 - (b) Common Base
 - (c) **Common Collector**
 - (d) Darlington Pair
2169. The purpose of a clamping circuit is to:
- (a) Amplify the signal
 - (b) Limit the voltage
 - (c) **Shift the DC level of a waveform**
 - (d) Rectify the input

2170. A NOT gate has an input of logic '1'. The output will be:
- (a) **0**
 - (b) 1
 - (c) Undefined
 - (d) Same as input
2171. A silicon diode in a circuit has 0.7V across it and is forward biased. If the temperature increases, what happens to the forward voltage drop?
- (a) Increases
 - (b) **Decreases**
 - (c) Remains the same
 - (d) Becomes zero
2172. An op-amp with a very high gain is configured as an inverting amplifier with feedback. If the input signal becomes very large, what type of distortion may occur?
- (a) Harmonic distortion
 - (b) **Clipping**
 - (c) Crossover distortion
 - (d) Phase distortion
2173. What type of junction is used in a basic diode?
- (a) NN
 - (b) **PN**
 - (c) PP
 - (d) NP
2174. When a diode is forward biased, it:
- (a) Blocks current
 - (b) Allows current in reverse direction
 - (c) **Allows current in forward direction**
 - (d) Acts as a resistor
2175. In reverse bias, a diode conducts:
- (a) Fully
 - (b) **Slightly (leakage current)**
 - (c) With high efficiency
 - (d) Like a battery
2176. The typical forward voltage drop for a silicon diode is:
- (a) 0.1 V
 - (b) 0.3 V
 - (c) **0.7 V**
 - (d) 1.5 V

2177. The knee voltage of a diode is the voltage at which:
- (a) The diode starts leaking
 - (b) **Forward current increases rapidly**
 - (c) Reverse breakdown begins
 - (d) It behaves as an insulator
2178. Which diode emits light when forward biased?
- (a) Zener diode
 - (b) **LED**
 - (c) Photodiode
 - (d) Tunnel diode
2179. Which diode works in reverse bias and generates current in response to light?
- (a) LED
 - (b) Zener diode
 - (c) **Photodiode**
 - (d) Schottky diode
2180. What is the key characteristic of a Schottky diode?
- (a) High reverse resistance
 - (b) **Low forward voltage drop**
 - (c) High capacitance
 - (d) Zero breakdown voltage
2181. A tunnel diode is used in:
- (a) Low-frequency rectification
 - (b) **High-frequency oscillators**
 - (c) Signal clipping
 - (d) Voltage regulation
2182. A half-wave rectifier gives output during:
- (a) Both halves of AC cycle
 - (b) **Positive half only**
 - (c) Negative half only
 - (d) No part of the cycle
2183. In a full-wave bridge rectifier, how many diodes conduct at a time?
- A) 1
 - B) 2**
 - C) 3
 - D) 4

2184. The PIV (Peak Inverse Voltage) across each diode in a full-wave bridge rectifier is:
- (a) **V_m**
 - (b) $2V_m$
 - (c) $V_m/2$
 - (d) Zero
2185. Clipping circuits are used to:
- (a) Convert AC to DC
 - (b) **Remove portions of signal**
 - (c) Amplify signals
 - (d) Invert signals
2186. Clamping circuits shift the:
- (a) Frequency of waveform
 - (b) Amplitude & frequency
 - (c) **DC level**
 - (d) Phase
2187. The maximum current a diode can safely conduct is called:
- (a) Peak inverse current
 - (b) **Average forward current**
 - (c) Reverse leakage
 - (d) Breakdown current
2188. What is reverse leakage current in a diode?
- (a) Forward conduction
 - (b) **Current during reverse bias**
 - (c) Peak current
 - (d) None of the above
2189. Which factor affects the reverse recovery time of a diode?
- (a) **Material**
 - (b) Load resistance
 - (c) Capacitance
 - (d) Operating temperature
2190. Which diode parameter is most important for high-speed switching?
- (a) Reverse voltage rating
 - (b) Capacitance
 - (c) **Recovery time**
 - (d) Forward current

2191. The dynamic resistance of a diode is calculated using:
- (a) Ohm's law
 - (b) dV/dI in forward region**
 - (c) Power formula
 - (d) $P = IV$
2192. Which application uses a Zener diode?
- (a) Current amplification
 - (b) Frequency modulation
 - (c) Overvoltage protection**
 - (d) Filtering
2193. Which diode is used in RF tuning circuits?
- (a) LED
 - (b) Zener diode
 - (c) Varactor diode**
 - (d) Tunnel diode
2194. Photodiodes are typically operated in:
- (a) Forward bias
 - (b) Reverse bias**
 - (c) Zero bias
 - (d) Breakdown region
2195. Static resistance of a diode is defined as:
- (a) dV/dI at any point
 - (b) V/I at a specific point**
 - (c) Maximum voltage / current
 - (d) Voltage at zero current
2196. Dynamic resistance is important in:
- (a) DC circuits only
 - (b) Small signal AC analysis**
 - (c) Power calculations
 - (d) Reverse bias condition only
2197. If the diode's forward current increases, its dynamic resistance:
- (a) Increases
 - (b) Decreases**
 - (c) Remains constant
 - (d) Becomes zero

2198. Zener breakdown occurs due to:
- (a) High temperature
 - (b) Avalanche multiplication
 - (c) **Tunneling of electrons**
 - (d) Recombination of holes
2199. Avalanche breakdown is dominant in Zener diodes above:
- (a) 1V
 - (b) **5.6V**
 - (c) 0.7V
 - (d) 10V
2200. Zener diodes are generally operated in:
- (a) Forward bias
 - (b) **Reverse breakdown region**
 - (c) Zero bias
 - (d) Cut-off mode
2201. In a voltage regulator circuit, Zener diode is connected:
- (a) In series and forward biased
 - (b) **In parallel and reverse biased**
 - (c) In parallel and forward biased
 - (d) In series with the load
2202. If Zener diode voltage rating is 6V, it will maintain:
- (a) 0V
 - (b) **Constant 6V across load**
 - (c) 12V
 - (d) Varies with current
2203. Schottky diodes are formed by the junction of:
- (a) P-N
 - (b) **Metal-Semiconductor**
 - (c) N-P-N
 - (d) P-type metals
2204. A key feature of a Schottky diode is:
- (a) High reverse leakage
 - (b) Large junction capacitance
 - (c) **Very fast switching speed**
 - (d) Zero forward drop

2205. The forward voltage drop of a Schottky diode is approximately:
- (a) **0.2V–0.3V**
 - (b) 0.6V
 - (c) 1.5V
 - (d) 3V
2206. Which of the following is preferred in high-speed switching circuits?
- (a) Zener diode
 - (b) Tunnel diode
 - (c) **Schottky diode**
 - (d) Varactor diode
2207. Tunnel diode works due to:
- (a) Avalanche breakdown
 - (b) **Tunneling effect in heavily doped P-N junction**
 - (c) Magnetic coupling
 - (d) Emission of photons
2208. Tunnel diode shows negative resistance in its:
- (a) Breakdown region
 - (b) **Peak to valley region**
 - (c) Forward bias saturation
 - (d) Reverse bias only
2209. Which of the following is considered the fastest diode?
- (a) Tunnel diode
 - (b) Schottky diode
 - (c) **Step recovery diode**
 - (d) LED
2210. Step recovery diodes are typically used in:
- (a) Rectification
 - (b) **High-frequency pulse generation**
 - (c) Voltage clamping
 - (d) Light emission
2211. A varactor diode is also known as a:
- (a) Switching diode
 - (b) **Variable capacitor diode**
 - (c) Amplifying diode
 - (d) Breakdown diode

2212. In a varactor diode, the capacitance is controlled by:
- (a) Current
 - (b) Temperature
 - (c) **Reverse voltage**
 - (d) Forward voltage
2213. Varactor diodes are commonly used in:
- (a) **Oscillators and RF tuning circuits**
 - (b) Power supply filtering
 - (c) Amplifier biasing
 - (d) Bridge rectifiers
2214. The capacitance of a varactor diode:
- (a) Increases with reverse voltage
 - (b) Remains constant
 - (c) **Decreases with reverse voltage**
 - (d) Only depends on frequency
2215. A PIN diode is unique because it has:
- (a) **Three layers: P, I (Intrinsic), N**
 - (b) Positive-intrinsic-negative behavior
 - (c) Metallic junction
 - (d) High barrier potential
2216. In RF and microwave applications, PIN diodes are used as:
- (a) Voltage regulators
 - (b) Constant current sources
 - (c) **RF switches and attenuators**
 - (d) Voltage clippers
2217. The intrinsic layer in a PIN diode:
- (a) Increases capacitance
 - (b) Reduces resistance in reverse bias
 - (c) **Helps in high-frequency response**
 - (d) Blocks forward conduction
2218. Which diode is best suited for RF switching due to its linear resistance properties?
- (a) Tunnel diode
 - (b) **PIN diode**
 - (c) Varactor diode
 - (d) Schottky diode

- 2219.** A transistor has how many terminals?
- A) 2
 - B) 3**
 - C) 4
 - D) 5
- 2220.** The three terminals of a BJT are:
- (a) Anode, Cathode, Plate
 - (b) Source, Gate, Drain
 - (c) Emitter, Base, Collector**
 - (d) Positive, Negative, Neutral
- 2221.** Which transistor is more commonly used in switching applications?
- (a) UJT
 - (b) FET
 - (c) BJT**
 - (d) Zener
- 2222.** Which of the following is a unipolar device?
- (a) BJT
 - (b) SCR
 - (c) FET**
 - (d) Diode
- 2223.** In a BJT, current conduction is due to:
- (a) Electrons only
 - (b) Holes only
 - (c) Both electrons and holes**
 - (d) Ions
- 2224.** In an NPN transistor, the arrow on the emitter points:
- (a) Inward
 - (b) Outward**
 - (c) Towards collector
 - (d) No direction
- 2225.** Which region of a BJT is thin and lightly doped?
- (a) Collector
 - (b) Base**
 - (c) Emitter
 - (d) Substrate

2226. What is β (beta) in a BJT?
- (a) Input resistance
 - (b) Voltage gain
 - (c) **Collector current / base current gain**
 - (d) Current loss factor
2227. In which region does a BJT act as an amplifier?
- (a) Cut-off
 - (b) Saturation
 - (c) **Active**
 - (d) Breakdown
2228. Biasing is necessary in a BJT to:
- (a) Increase size
 - (b) Reduce cost
 - (c) **Set Q-point and allow amplification**
 - (d) Change material
2229. Which biasing method provides the best thermal stability for transistor?
- (a) Fixed bias
 - (b) **Voltage-divider bias**
 - (c) Collector-feedback bias
 - (d) Self-bias
2230. Thermal runaway occurs in transistor due to:
- (a) Sudden cooling
 - (b) **Increase in collector current due to temperature rise**
 - (c) Faulty capacitor
 - (d) No base current
2231. The Q-point on a load line of transistor refers to:
- (a) **Quiescent point (steady state DC voltage & current level at which transistor operates W/O I/P Signal)**
 - (b) Quality factor
 - (c) Quantum level
 - (d) Quota point
2232. In CE configuration of BJT, the phase shift between input and output is:
- (a) 0°
 - (b) 90°
 - (c) **180°**
 - (d) 360°

2233. For BJT , Voltage gain is highest in which configuration?
- (a) **CE**
 - (b) CB
 - (c) CC
 - (d) Emitter follower
2234. In BJT configuration, AC load line is drawn to analyze:
- (a) Power loss
 - (b) Large signal behavior
 - (c) **Output voltage swing**
 - (d) DC biasing
2235. The input impedance of a BJT CE (Common Emitter) amplifier is typically:
- (a) Very high
 - (b) **Low**
 - (c) Infinite
 - (d) Zero
2236. In small signal analysis, transistor acts as:
- (a) Open circuit
 - (b) Constant current source
 - (c) Capacitor
 - (d) **Amplifier with gain**
2237. In saturation mode, a BJT behaves as a:
- (a) Resistor
 - (b) Open circuit
 - (c) **Closed switch**
 - (d) Amplifier
2238. A transistor switch is OFF when it is in:
- (a) Active mode
 - (b) Saturation
 - (c) **Cut-off**
 - (d) Breakdown
2239. In switching circuits, the collector-emitter voltage in ON state is:
- (a) Zero
 - (b) **Very low**
 - (c) Very high
 - (d) Equal to supply

- 2240. Transistors used in logic gates operate mainly in:**
- (a) Linear region
 - (b) Active mode
 - (c) **Switching (cut-off/saturation)**
 - (d) Breakdown region
- 2241. When used as a switch, a transistor should quickly change between:**
- (a) Amplifying and blocking
 - (b) Active and passive
 - (c) **Cut-off and saturation**
 - (d) Forward and reverse
- 2242. A JFET is controlled by:**
- (a) Current
 - (b) **Voltage at gate**
 - (c) Collector resistance
 - (d) Diode bias
- 2243. Main advantage of FET over BJT is:**
- (a) High current gain
 - (b) **Low noise and high input impedance**
 - (c) High voltage gain
 - (d) High power handling
- 2244. The gate of a JFET is always:**
- (a) Forward biased
 - (b) **Reverse biased**
 - (c) Shorted
 - (d) Grounded
- 2245. In N-channel JFET, current flows from:**
- (a) **Source to drain**
 - (b) Drain to source
 - (c) Gate to source
 - (d) Gate to drain
- 2246. The region in JFET where current remains constant is:**
- (a) Ohmic region
 - (b) **Saturation region**
 - (c) Cut-off region
 - (d) Breakdown

2247. A Darlington pair offers:
- (a) High voltage gain
 - (b) High input resistance
 - (c) **Very high current gain**
 - (d) Low power consumption
2248. The output of a phototransistor depends on:
- (a) Temperature
 - (b) Input current
 - (c) **Light intensity**
 - (d) Biasing voltage
2249. A UJT is mainly used in:
- (a) Power amplification
 - (b) Voltage regulation
 - (c) **Oscillator circuits**
 - (d) Rectification
2250. Which device combines two BJTs into one package?
- (a) Phototransistor
 - (b) UJT
 - (c) **Darlington pair**
 - (d) FET
2251. Power transistors are designed to handle:
- (a) Low current only
 - (b) **High voltage and current**
 - (c) High frequency only
 - (d) Small signal only
2252. While testing a good NPN transistor with a multimeter, you will find:
- (a) Both junctions open
 - (b) Both junctions short
 - (c) One forward, one reverse reading
 - (d) **Forward reading from base to both collector and emitter**
2253. A transistor amplifier increases:
- (a) Resistance
 - (b) Capacitance
 - (c) **Signal power**
 - (d) Supply voltage

2254. Which of the following is not a typical transistor application?
- (a) **Rectifier**
 - (b) Amplifier
 - (c) Switch
 - (d) Oscillator
2255. In ICs, transistors are used in the form of:
- (a) Individual components
 - (b) Diodes
 - (c) **Transistor arrays**
 - (d) Relays
2256. A transistor tester mainly checks:
- (a) Resistance
 - (b) Capacitance
 - (c) Forward junctions
 - (d) **Current gain**
2257. Which transistor configuration offers the highest voltage gain?
- (a) Common Base
 - (b) **Common Emitter**
 - (c) Common Collector
 - (d) All are equal
2258. Which transistor configuration is commonly used for impedance matching?
- (a) Common Emitter
 - (b) **Common Collector**
 - (c) Common Base
 - (d) None of the above
2259. In which transistor configuration is the input resistance the lowest?
- (a) Common Emitter
 - (b) Common Collector
 - (c) **Common Base**
 - (d) All equal
2260. Common base configuration is mainly used in:
- (a) Voltage regulation
 - (b) Low-frequency amplification
 - (c) **High-frequency applications**
 - (d) Switching circuits

2261. The common collector configuration is also known as:

- (a) **Emitter follower**
- (b) Base follower
- (c) Voltage amplifier
- (d) Phase shifter

2262. Fixed bias circuit suffers from:

- (a) **Stability issues**
- (b) High gain
- (c) Low distortion
- (d) High input impedance

2263. Voltage divider biasing is mostly used in:

- (a) Class D amplifiers
- (b) Logic gates
- (c) **Audio amplifiers**
- (d) Oscillators

2264. In collector-feedback bias, stability is achieved using:

- (a) Capacitor
- (b) **Resistor feedback from collector to base**
- (c) Transformer
- (d) Zener diode

2265. Thermal runaway is reduced by:

- (a) Increasing supply voltage
- (b) Using fixed bias
- (c) **Using emitter resistor in biasing**
- (d) Removing heat sink

2266. JFET is a:

- (a) **Voltage-controlled current device**
- (b) Current-controlled voltage device
- (c) Voltage amplifier
- (d) Rectifier

2267. Compared to BJT, JFET has:

- (a) Lower input impedance
- (b) **Higher input impedance**
- (c) Higher noise
- (d) Higher current gain

2268. Which device is preferred in low-noise amplifiers?
- (a) BJT
 - (b) SCR
 - (c) **JFET**
 - (d) Diode
2269. JFETs are better than BJTs for:
- (a) Power amplification
 - (b) RF switching
 - (c) Digital logic
 - (d) **Low signal input amplification**
2270. In terms of control, BJT is _____ and JFET is _____
- (a) **Current-controlled, voltage-controlled**
 - (b) Voltage-controlled, current-controlled
 - (c) Resistance-controlled, temperature-controlled
 - (d) Power-controlled, frequency-controlled
2271. The JFET operates in saturation region for:
- (a) **Constant drain current**
 - (b) Maximum gain
 - (c) Breakdown operation
 - (d) Zero current flow
2272. In JFET, pinch-off voltage is the voltage where:
- (a) Gate current stops
 - (b) **Drain current is maximum and constant**
 - (c) Channel breaks
 - (d) Saturation current becomes zero
2273. When $V_{gs} = 0$, the JFET conducts:
- (a) **Maximum current**
 - (b) Minimum current
 - (c) No current
 - (d) Reverse current
2274. JFET input characteristic is like:
- (a) A forward-biased diode
 - (b) **Reverse-biased junction**
 - (c) Zener diode
 - (d) Triac

2275. Output characteristics of JFET show:
- (a) Increasing current with increasing voltage
 - (b) Constant current beyond pinch-off**
 - (c) Negative resistance
 - (d) Linear increase in voltage
2276. In power amplifiers, the transistor works in:
- (a) Cut-off
 - (b) Active region**
 - (c) Breakdown region
 - (d) Forward-biased region only
2277. Power transistors are most commonly found in:
- (a) Digital logic
 - (b) Power supplies and amplifiers**
 - (c) Low-voltage detectors
 - (d) Oscillators
2278. The safe operating area (SOA) in power transistors indicates:
- (a) Only voltage limits
 - (b) Power dissipation limit
 - (c) Maximum current and voltage ratings**
 - (d) Frequency range
2279. UJT is most commonly used in:
- (a) Amplifiers
 - (b) Oscillators and triggering circuits
 - (c) Rectifiers
 - (d) Current regulators
- Answer: B
2280. The most important application of UJT is in:
- (a) Clipping circuits
 - (b) Sawtooth waveform generation
 - (c) Voltage regulation
 - (d) High-frequency amplification
- Answer: B
2281. UJT relaxation oscillator output is typically:
- (a) Square wave
 - (b) Sine wave
 - (c) Sawtooth wave
 - (d) Triangular wave
- Answer: C

2282. UJT is preferred in triggering SCRs because of:

- (a) Low power consumption
- (b) High frequency output
- (c) Negative resistance region
- (d) High voltage gain

Answer: C

2283. In a UJT, the intrinsic stand-off ratio is used to:

- (a) Set the cutoff current
- (b) Determine peak point voltage
- (c) Amplify input signals
- (d) Regulate voltage

Answer: B

2284. Photo transistors are used in:

- (a) Voltage regulators
- (b) Light-sensitive switches
- (c) Oscillators
- (d) Transformers

Answer: B

2285. Photo transistor operates effectively in which region?

- (a) Cut-off
- (b) Active
- (c) Breakdown
- (d) Saturation

Answer: B

2286. In a photo transistor, light increases:

- (a) Collector current
- (b) Emitter voltage
- (c) Resistance
- (d) Power loss

Answer: A

2287. Which is NOT a common use of photo transistor?

- (a) Object detection
- (b) Light sensing
- (c) Audio amplification
- (d) Optical Encoder feedback

Answer: C

2288. The main advantage of Darlington pair is:

- (a) Higher voltage rating
- (b) Higher frequency response
- (c) Very high current gain
- (d) Temperature stability

Answer: C

2289. The current gain of a Darlington pair is approximately:

- (a) β
- (b) 2β
- (c) $\beta_1 + \beta_2$
- (d) $\beta_1 \times \beta_2$

Answer: D

2290. Darlington transistors are used in:

- (a) RF applications
- (b) Power switching and amplifiers
- (c) Oscillators
- (d) Tuning circuits

Answer: B

2291. One drawback of Darlington pair is:

- (a) Very low gain
- (b) Increased voltage drop (V_{BE})
- (c) Reduced input impedance
- (d) Low current handling

Answer: B

2292. SCR stands for:

- (a) Silicon Capacitor Resistor
- (b) Silicon Controlled Rectifier
- (c) Series Current Regulator
- (d) Single Circuit Resistor

Answer: B

2293. How many terminals does an SCR have?

- A) 2
- B) 3
- C) 4
- D) 5

Answer: B

2294. The three terminals of an SCR are:

- (a) Emitter, Base, Collector
- (b) Gate, Drain, Source
- (c) Anode, Cathode, Gate
- (d) Source, Gate, Drain

Answer: C

2295. The SCR starts conducting when:

- (a) Voltage is applied across cathode
- (b) Current is applied to anode
- (c) Gate is triggered and forward voltage is applied
- (d) Anode is grounded

Answer: C

2296. The SCR is a type of:

- (a) Unidirectional switch
- (b) Amplifier
- (c) Bipolar transistor
- (d) Bidirectional device

Answer: A

2297. In reverse blocking mode of SCR:

- (a) Anode is positive w.r.t. cathode
- (b) Cathode is positive w.r.t. anode
- (c) SCR conducts fully
- (d) SCR behaves like a short circuit

Answer: B

2298. Latching current is the minimum current in SCR to:

- (a) Turn ON SCR
- (b) Keep SCR in OFF state
- (c) Keep SCR conducting after gate pulse is removed
- (d) Reverse bias the SCR

Answer: C

2299. Holding current is the minimum current in SCR to:

- (a) Keep SCR ON
- (b) Maintain reverse bias
- (c) Turn OFF the SCR after conduction
- (d) Trigger the SCR

Answer: A

2300. Once an SCR is ON, it can be turned OFF by:

- (a) Reducing gate current
- (b) Interrupting anode current below holding level
- (c) Applying positive gate pulse
- (d) Increasing anode current

Answer: B

2301. The SCR remains in conducting state until:

- (a) Gate voltage is removed
- (b) Voltage is reversed
- (c) Current falls below holding current
- (d) Cathode becomes positive

Answer: C

2302. Which is NOT a method of triggering an SCR?

- (a) Gate triggering
- (b) dv/dt triggering
- (c) Magnetic triggering
- (d) Thermal triggering

Answer: C

2303. dv/dt triggering in SCR is due to:

- (a) Gate pulse
- (b) Sudden increase in gate current
- (c) Rapid change in anode voltage
- (d) High holding current

Answer: C

2304. In line (natural) commutation, SCR turns off when:

- (a) Supply is removed
- (b) Gate signal is reduced
- (c) AC current passes through zero
- (d) Voltage is reversed

Answer: C

2305. Forced commutation is mainly used in:

- (a) AC circuits
- (b) High-frequency DC circuits
- (c) Low-frequency AC motors
- (d) Transformers

Answer: B

2306. Which commutation method is most commonly used in inverter circuits?

- (a) Class A
- (b) Class C
- (c) Class E
- (d) Class B

Answer: C

2307. dv/dt rating indicates:

- (a) Rate of change of current
- (b) Rate of temperature rise
- (c) Rate of change of voltage
- (d) Rate of gate triggering

Answer: C

2308. High dv/dt across SCR may cause:

- (a) Delay in conduction
- (b) Reverse bias
- (c) False triggering
- (d) Decrease in holding current

Answer: C

2309. A snubber circuit is used to protect SCR from:

- (a) Low voltage
- (b) Overcurrent
- (c) dv/dt effect
- (d) Gate noise

Answer: C

2310. di/dt protection is usually provided using:

- (a) Capacitor in parallel
- (b) Fuse
- (c) Inductor in series
- (d) Resistor in gate circuit

Answer: C

2311. SCR requires a heat sink because:

- (a) It conducts at low temperature
- (b) It stores energy
- (c) It generates heat during conduction
- (d) It operates only when cool

Answer: C

2312. SCR is NOT typically used in:

- (a) Motor speed control
- (b) AC voltage regulation
- (c) RF signal amplification
- (d) Phase control

Answer: C

2313. A light-triggered SCR is called:

- (a) DIAC
- (b) LASCR
- (c) TRIAC
- (d) GTO

Answer: B

2314. Compared to TRIAC, SCR is:

- (a) Bidirectional
- (b) Unidirectional
- (c) Used in RF circuits
- (d) More commonly used in lamps

Answer: B

2315. SCR is also known as a:

- (a) Voltage-controlled switch
- (b) Phase inverter
- (c) Thyristor
- (d) Transformer

Answer: C

2316. In a controlled rectifier using SCR, the firing angle controls:

- (a) Output frequency
- (b) Output voltage
- (c) Current gain
- (d) Efficiency

Answer: B

2317. The firing angle of an SCR refers to:

- (a) The time it takes for the SCR to turn off
- (b) The voltage drop across the gate
- (c) The delay angle after the zero crossing at which SCR is triggered
- (d) The reverse bias voltage

Answer: C

- 2318.** If the firing angle of an SCR in an AC half-wave rectifier is increased from 30° to 90° , the average output voltage will:
- (a) Increase
 - (b) Remain the same
 - (c) Decrease
 - (d) Become zero
- Answer: C
- 2319.** In a single-phase full-wave controlled rectifier, if the firing angle is 180° , the output voltage is:
- (a) Maximum
 - (b) Half of peak voltage
 - (c) Zero
 - (d) Negative
- Answer: C
- 2320.** Which component is commonly used to control the firing angle of an SCR?
- (a) Capacitor
 - (b) Resistor
 - (c) Pulse transformer
 - (d) Triggering circuit or controller
- Answer: D
- 2321.** For an SCR to conduct in each cycle, the firing angle must be:
- (a) Greater than 180°
 - (b) Less than or equal to 180°
 - (c) Between 270° and 360°
 - (d) Zero
- Answer: B
- 2322.** The input impedance of a FET is generally:
- (a) Low
 - (b) Very high
 - (c) Zero
 - (d) Medium
- Answer: B
- 2323.** Which FET configuration has unity voltage gain?
- (a) Common Gate
 - (b) Common Drain
 - (c) Common Source
 - (d) All of the above
- Answer: B

2324. Which of the following can operate in both depletion and enhancement modes?

- (a) JFET
- (b) BJT
- (c) Depletion MOSFET
- (d) UJT

Answer: C

2325. FETs are better than BJTs for:

- (a) Low-frequency operation
- (b) Large current handling
- (c) Impedance matching and noise performance
- (d) Power amplification

Answer: C

2326. What protects a MOSFET from static damage?

- (a) Heat sink
- (b) Biasing resistors
- (c) Gate protection diode
- (d) Series inductor

Answer: C

2327. Which one is used in CMOS technology?

- (a) Only N-channel MOSFET
- (b) Only P-channel MOSFET
- (c) Both N-channel and P-channel
- (d) BJT

Answer: C

2328. MESFET stands for:

- (a) Metal Electron Semiconductor FET
- (b) Metal Semiconductor FET
- (c) Metal Electric Semiconductor FET
- (d) Metallic Enhanced Semiconductor FET

Answer: B

2329. CMOS is widely used in:

- (a) High-power applications
- (b) Digital integrated circuits
- (c) Audio frequency amplifiers
- (d) Electroplating

Answer: B

2330. Which transistor has better switching speed?

- (a) BJT
- (b) IGBT
- (c) MOSFET
- (d) UJT

Answer: C

2331. A key feature of CMOS is:

- (a) Low speed
- (b) Low static power consumption
- (c) High heat generation
- (d) High voltage drop

Answer: B

2332. The biggest disadvantage of MOSFET is:

- (a) High speed
- (b) Susceptibility to static charge
- (c) High power dissipation
- (d) Difficult biasing

Answer: B

2333. Which of the following is an advantage of ICs over discrete components?

- (a) Larger size
- (b) Higher power dissipation
- (c) Higher cost
- (d) Compactness and reliability

Answer: D

2334. In which type of IC fabrication are both active and passive components integrated on a single chip?

- (a) Hybrid
- (b) Thin film
- (c) Monolithic
- (d) Thick film

Answer: C

2335. Which parameter defines the ability of an Op-Amp to reject common-mode signals?

- (a) Slew Rate
- (b) Offset Voltage
- (c) Gain Bandwidth
- (d) CMRR

Answer: D

2336. In a practical application, a voltage follower (OPAMP) is used to:

- (a) Amplify input signal
- (b) Act as an oscillator
- (c) Provide high input and low output impedance
- (d) Perform differentiation

Answer: C

2337. In a summing amplifier using IC 741, the output is:

- (a) Equal to the average of input voltages
- (b) In phase with input
- (c) Inverted sum of inputs
- (d) Square of input voltages

Answer: C

2338. The 555 timer in astable mode is used for:

- (a) Generating a single pulse
- (b) Measuring temperature
- (c) Generating continuous square waves
- (d) Stabilizing voltage

Answer: C

2339. In a monostable 555 timer application, the output is:

- (a) A continuous square wave
- (b) A triangular wave
- (c) A single pulse for each trigger
- (d) Constant DC voltage

Answer: C

2340. Which voltage regulator provides 5V output in a fixed regulator series?

- (a) 7809
- (b) 7812
- (c) 7905
- (d) 7805

Answer: D

2341. LM317 is best used for:

- (a) Fixed positive voltage
- (b) Negative voltage
- (c) Adjustable voltage regulation
- (d) AC voltage control

Answer: C

2342. Which logic family is best known for low power consumption?

- (a) ECL
- (b) TTL
- (c) CMOS
- (d) RTL

Answer: C

2343. In practical digital circuits, a NOT gate can be implemented using IC:

- (a) 7408
- (b) 7432
- (c) 7400
- (d) 7404

Answer: D

2344. The most accurate and fastest ADC type is:

- (a) Flash
- (b) Dual slope
- (c) Counter type
- (d) Successive approximation

Answer: A

2345. In a DAC, the R-2R ladder network is preferred because:

- (a) It uses transistors
- (b) It's compact and resistor values are easy to fabricate
- (c) It requires no power
- (d) It has zero output resistance

Answer: B

2346. Which IC is most suitable for designing a small audio amplifier?

- (a) 741
- (b) 7805
- (c) LM386
- (d) 555

Answer: C

2347. In sensor signal conditioning circuits, Op-Amps are mainly used for:

- (a) Current limiting
- (b) Signal amplification and filtering
- (c) Pulse width modulation
- (d) Heat dissipation

Answer: B

2348. Which of the following is a Linear IC?

- (a) 741 Op-Amp
- (b) 7400 NAND Gate
- (c) 7490 Decade Counter
- (d) 4011 CMOS Gate

Answer: A

2349. A digital IC primarily deals with:

- (a) Continuous signals
- (b) Discrete binary signals
- (c) Analog voltage variations
- (d) Sine wave generation

Answer: B) Discrete binary signals

2350. Which IC is classified under digital ICs?

- (a) LM317
- (b) LM741
- (c) 7408 AND Gate
- (d) LM386

Answer: C) 7408 AND Gate

2351. Linear ICs are commonly used in:

- (a) Counters
- (b) Amplifiers
- (c) Logic operations
- (d) Flip-flops

Answer: B) Amplifiers

2352. Which of the following IC packages has two parallel rows of pins?

- (a) DIP (Dual In-line Package)
- (b) SIP
- (c) BGA
- (d) SMD

Answer: A) DIP (Dual In-line Package)

2353. The main advantage of SMD (Surface Mount Device) packaging is:

- (a) Requires sockets
- (b) Difficult to place
- (c) Saves PCB space and suitable for automation
- (d) Used only in analog circuits

Answer: C) Saves PCB space and suitable for automation

2354. Which IC package is best suited for high pin count and heat dissipation in modern processors?

- (a) SIP
- (b) BGA (Ball Grid Array)
- (c) DIP
- (d) QFP

Answer: B) BGA (Ball Grid Array)

2355. Which IC package has a single row of pins and is often used in memory modules?

- (a) SIP (Single In-line Package)
- (b) QFP
- (c) DIP
- (d) BGA

Answer: A) SIP (Single In-line Package)

2356. The QFP (Quad Flat Package) is characterized by:

- (a) Pins on two sides
- (b) Pins on all four sides
- (c) No visible pins
- (d) Only for power ICs

Answer: B) Pins on all four sides

2357. Which of the following is NOT a surface-mount package?

- (a) QFP
- (b) BGA
- (c) DIP
- (d) SOT

Answer: C) DIP

2358. The IGBT is a combination of which two semiconductor devices?

- (a) BJT and SCR
- (b) MOSFET and BJT
- (c) Diode and MOSFET
- (d) FET and UJT

Answer: B) MOSFET and BJT

2359. The control input of an IGBT is:

- (a) Voltage-controlled
- (b) Current-controlled
- (c) Temperature-controlled
- (d) Light-controlled

Answer: A)

2360. Which application does NOT typically use IGBT?

- (a) Electric trains
- (b) Microwave ovens
- (c) Induction cooktops
- (d) High-speed RF amplifiers

Answer: D)

2361. One of the primary advantages of IGBT over BJT is:

- (a) Higher breakdown voltage
- (b) Lower cost
- (c) Simpler structure
- (d) Easy voltage control at the gate

Answer: D)

2362. A key limitation of IGBT is:

- (a) Low switching frequency
- (b) Poor thermal conductivity
- (c) High input current
- (d) High leakage current

Answer: A) Low switching frequency

2363. In automation, IGBT is most commonly used in:

- (a) Data acquisition systems
- (b) Programmable logic controllers
- (c) Variable frequency drives (VFDs)
- (d) Analog timers

Answer: C) Variable frequency drives (VFDs)

2364. Why are IGBTs preferred in CNC machines?

- (a) They are cheaper than BJTs
- (b) They are easy to cool
- (c) They provide efficient and reliable motor switching
- (d) They amplify analog signals

Answer: C) They provide efficient and reliable motor switching

2365. Compared to MOSFETs, IGBTs are more suitable for:

- (a) Low voltage applications
- (b) High-speed switching
- (c) High voltage and current applications
- (d) RF amplifiers

Answer: C) High voltage and current applications

2366. Among the following, which device generally has the **highest switching speed**?

- (a) IGBT
- (b) BJT
- (c) MOSFET
- (d) Thyristor

Answer: C) MOSFET

2367. In electric motor drives, IGBTs are preferred in inverters because:

- (a) They are purely analog devices
- (b) They can handle switching of large currents and voltages
- (c) They store electric charge
- (d) They act as transformers

Answer: B) They can handle switching of large currents and voltages

2368. The use of IGBTs in SMPS circuits is ideal due to:

- (a) Their resistance to humidity
- (b) Their ability to amplify low-frequency signals
- (c) Their fast switching and high efficiency
- (d) Their built-in transformers

Answer: C) Their fast switching and high efficiency

2369. What role does the IGBT play in a Variable Frequency Drive (VFD)?

- (a) Acts as a fuse for protection
- (b) Converts mechanical energy into electrical energy
- (c) Rapidly switches DC to convert to AC to control motor speed
- (d) Regulates oil pressure in hydraulics

Answer: C) Rapidly switches DC to convert to AC to control motor speed

2370. A VFD shows an overcurrent fault at startup. Which IGBT-related issue is the most likely cause?

- (a) Low input voltage
- (b) Capacitor failure in DC bus
- (c) IGBT short-circuit or gate drive fault
- (d) Faulty keypad

Answer: C) IGBT short-circuit or gate drive fault

2371. An IGBT in a VFD fails repeatedly. What is a common reason for repeated IGBT damage?

- (a) Overvoltage from input supply
- (b) Weak fan in the keypad
- (c) Loose mounting bolts
- (d) Low PWM frequency

Answer: A) Overvoltage from input supply

2372. If a VFD's output is completely dead, but input and DC bus are normal, what should be checked first?

- (a) Fuse at input terminal
- (b) Motor winding resistance
- (c) Output IGBTs and gate driver circuit
- (d) Keypad display contrast

Answer: C) Output IGBTs and gate driver circuit

2373. What is the likely symptom of an open (not switching) IGBT in a VFD?

- (a) VFD powers off completely
- (b) DC bus voltage becomes negative
- (c) One output phase is missing or voltage is low
- (d) Keypad shows no error

Answer: C) One output phase is missing or voltage is low

2374. IGBT failure in a VFD may result in which of the following warning/error messages?

- (a) EEPROM Error
- (b) Over Temperature or Output Short Circuit
- (c) Modbus Communication Failure
- (d) Low Motor Speed

Answer: B) Over Temperature or Output Short Circuit

2375. Repeated tripping on "IGBT Desaturation" in a VFD usually means:

- (a) The IGBTs are saturated and working normally
- (b) The IGBT is not turning on fully or is damaged
- (c) The cooling fan is oversized
- (d) The input frequency is too high

Answer: B) The IGBT is not turning on fully or is damaged

2376. What can cause IGBT overheating in a VFD during normal operation?

- (a) Low ambient temperature
- (b) Proper heat sink connection
- (c) Inadequate cooling or heatsink contact
- (d) Perfect PWM control

Answer: C) Inadequate cooling or heatsink contact

2377. A VFD shows erratic behavior during switching. The most probable issue with the IGBT gate drive is:

- (a) Constant ON signal
- (b) Floating gate signal or noise
- (c) Zero voltage at collector
- (d) Open motor terminal

Answer: B) Floating gate signal or noise

2378. The main function of a rectifier is to:

- (a) Convert DC to AC
- (b) Filter AC voltage
- (c) Convert AC to DC
- (d) Step up voltage

Answer: C) Convert AC to DC

2379. Rectifiers are widely used in:

- (a) Oscillators
- (b) Power supply units
- (c) RF communication
- (d) Audio amplifiers

Answer: B) Power supply units

2380. A half-wave rectifier conducts for how much of the input AC cycle?

- (a) 100%
- (b) 50%
- (c) 25%
- (d) 75%

Answer: B) 50%

2381. A full-wave bridge rectifier requires how many diodes?

- A) 1
- B) 2
- C) 3
- D) 4

Answer: D) 4

2382. The main advantage of full-wave rectification over half-wave is:

- (a) Lower PIV
- (b) Higher ripple
- (c) Higher efficiency and smoother DC
- (d) Less number of components

Answer: C) Higher efficiency and smoother DC

2383. In a center-tap full-wave rectifier, the PIV across each diode is:

- (a) V_m
- (b) $2V_m$
- (c) $V_m/2$
- (d) Zero

Answer: b

2384. Ripple factor for a full-wave rectifier is approximately:

- (a) 1.21
- (b) 0.482
- (c) 0.707
- (d) 0

Answer: B) 0.482

2385. The efficiency of a full-wave rectifier without filter is about:

- (a) 40.6%
- (b) 50%
- (c) 81.2%
- (d) 100%

Answer: C) 81.2%

2386. Peak Inverse Voltage (PIV) for a rectifier is is:

- (a) The voltage drop across the diode when it conducts
- (b) The average voltage
- (c) The maximum reverse voltage a diode can withstand
- (d) Always equal to zero

Answer: C) The maximum reverse voltage a diode can withstand

2387. A capacitor filter is most effective when connected:

- (a) In series with load
- (b) In parallel across the diode
- (c) Across the output of rectifier
- (d) In the input of transformer

Answer: C) Across the output of rectifier

2388. Which filter type provides the smoothest DC output?

- (a) Capacitor only
- (b) Inductor only
- (c) LC filter
- (d) π (pi) filter

Answer: D) π (pi) filter

2389. The purpose of filters in rectifier circuits is to:

- (a) Increase voltage
- (b) Reduce current
- (c) Reduce ripple
- (d) Act as a switch

Answer: C) Reduce ripple

2390. Compared to a half-wave rectifier, a full-wave rectifier has:

- (a) Lower efficiency
- (b) Higher ripple
- (c) Better transformer utilization
- (d) More voltage drop

Answer: C) Better transformer utilization

2391. A bridge rectifier is preferred over center-tap because:

- (a) It uses fewer diodes
- (b) It requires a special transformer
- (c) It provides full-wave rectification without center-tap
- (d) It works only on DC

Answer: C) It provides full-wave rectification without center-tap

2392. Which of the following devices is most likely to have a rectifier inside?

- (a) Electric heater
- (b) Solar panel
- (c) Laptop charger
- (d) Induction motor

Answer: C)

2393. In battery chargers, rectifiers are used to:

- (a) Convert AC to pulsating DC
- (b) Increase the voltage
- (c) Store energy
- (d) Filter the current

Answer: A) Convert AC to pulsating DC

2394. A full-wave rectifier with centre-tap uses how many diodes?

- A) 1
- B) 2
- C) 3
- D) 4

Answer: B) 2

2395. The centre-tap transformer is used in full-wave rectification to:

- (a) Step down voltage
- (b) Provide two equal & opposite voltages for diode operation
- (c) Filter output
- (d) Increase ripple

Answer: B) Provide two equal & opposite voltages for diode operation

2396. The PIV rating of each diode in a centre-tap full-wave rectifier is:

- (a) V_m
- (b) $2V_m$
- (c) $V_m/2$
- (d) Zero

Answer: b

2397. A full-wave bridge rectifier requires:

- (a) One diode
- (b) Two diodes and centre-tap
- (c) Four diodes and no centre-tap
- (d) Two diodes and a filter

Answer: C) Four diodes and no centre-tap

2398. What is the advantage of a bridge rectifier over centre-tap full-wave rectifier?

- (a) Lower efficiency
- (b) Higher PIV
- (c) No need for centre-tap transformer
- (d) More ripple

Answer: C) No need for centre-tap transformer

2399. A capacitor filter is usually connected in rectifier :

- (a) In series with the load
- (b) In parallel with the output
- (c) Across the transformer
- (d) In the gate circuit

Answer: B) In parallel with the output

2400. What effect does increasing capacitance in a rectifier circuit have on ripple?

- (a) Ripple increases
- (b) Ripple remains the same
- (c) Ripple decreases
- (d) No effect

Answer: C) Ripple decreases

2401. In a power supply circuit, rectifier section , the inductor filter is usually connected:

- (a) In series with load
- (b) In parallel with input
- (c) In parallel with load
- (d) Across the transformer

Answer: A) In series with load

2402. In rectifiers, An LC filter is more effective than a capacitor-only filter because:

- (a) It increases voltage
- (b) It allows both AC and DC
- (c) It suppresses both voltage and current ripple
- (d) It works at all frequencies

Answer: C) It suppresses both voltage and current ripple

2403. A rectifier used in welding equipment fails frequently. What might be the reason?

- (a) Low AC input
 - (b) Overcurrent or poor cooling
 - (c) Use of soft iron core
 - (d) Rectifier placement too far from the load
- Answer:** B) Overcurrent or poor cooling

2404. The ability of an amplifier to handle different frequencies is termed as amplifiers :

- (a) Distortion
- (b) Linearity
- (c) Bandwidth
- (d) Feedback

Answer: C) Bandwidth

2405. Which class of amplifier has the lowest efficiency?

- (a) Class A
- (b) Class B
- (c) Class C
- (d) Class D

Answer: A) Class A

2406. The maximum theoretical efficiency of a Class B amplifier is:

- (a) 25%
- (b) 50%
- (c) 78.5%
- (d) 100%

Answer: C) 78.5%

2407. An amplifier is said to be linear if:

- (a) Output is sinusoidal
- (b) Gain is constant for all frequencies
- (c) Output is directly proportional to input
- (d) It consumes more power

Answer: C) Output is directly proportional to input

2408. For an amplifier, Frequency response is a plot between:

- (a) Gain vs. Time
- (b) Power vs. Resistance
- (c) Gain vs. Frequency
- (d) Voltage vs. Current

Answer: C) Gain vs. Frequency

2409. Which class of amplifier has the highest linearity but lowest efficiency?

- (a) Class A
- (b) Class B
- (c) Class C
- (d) Class AB

Answer: A) Class A

2410. Class B amplifiers conduct for how much of the input signal?

- (a) 90°
- (b) 180°
- (c) 270°
- (d) 360°

Answer: B) 180°

2411. A push-pull amplifier is used to:

- (a) Reduce output power
- (b) Increase distortion
- (c) Eliminate even harmonics
- (d) Increase frequency

Answer: C) Eliminate even harmonics

2412. Which amplifier class is most efficient but highly nonlinear?

- (a) Class A
- (b) Class B
- (c) Class AB
- (d) Class C

Answer: D) Class C

2413. The main advantage of Class AB amplifier over Class B is:

- (a) Higher efficiency
- (b) Simpler circuit
- (c) Reduced crossover distortion
- (d) Lower cost

Answer: C) Reduced crossover distortion

- 2414.** A push-pull amplifier requires:
- (a) Two transistors working alternately
 - (b) A single transistor in saturation
 - (c) Constant DC bias
 - (d) Only resistive components

Answer: A) Two transistors working alternately

- 2415.** The output stage of a power amplifier is designed for:
- (a) Minimum distortion
 - (b) Maximum gain
 - (c) Maximum power transfer to load
 - (d) High input resistance

Answer: C) Maximum power transfer to load

- 2416.** Which amplifier class is ideal for high-fidelity (audio) systems?
- (a) Class C
 - (b) Class B
 - (c) Class A
 - (d) Class D

Answer: C) Class A

- 2417.** Class C amplifiers are mainly used for:
- (a) Audio amplification
 - (b) RF transmission
 - (c) Signal modulation
 - (d) Microphone preamps

Answer: B) RF transmission

- 2418.** Which of the following best describes Class C amplifiers?
- (a) High linearity, low efficiency
 - (b) High efficiency, high distortion
 - (c) Medium efficiency, low distortion
 - (d) Low gain, high power consumption

Answer: B) High efficiency, high distortion

- 2419.** Which component is typically used to restore the signal shape in a Class C amplifier?
- (a) Resistor
 - (b) Inductor
 - (c) LC Tank Circuit
 - (d) Transformer

Answer: C) LC Tank Circuit

2420. The efficiency of a well-designed Class D amplifier is usually:

- (a) Below 40%
- (b) Around 60%
- (c) Around 78%
- (d) Over 90%

Answer: D) Over 90%

2421. The common emitter amplifier is widely used because:

- (a) It has high voltage gain only
- (b) It has high input impedance
- (c) It offers both voltage and current gain
- (d) It inverts the signal twice

Answer: C) It offers both voltage and current gain

2422. The phase shift between input and output in a CE amplifier is:

- (a) 0°
- (b) 90°
- (c) 180°
- (d) 270°

Answer: C) 180°

2423. In a CE amplifier, the input is applied to:

- (a) Base and collector
- (b) Emitter and base
- (c) Collector and base
- (d) Collector and emitter

Answer: B) Emitter and base

2424. The input impedance of a CB amplifier is:

- (a) Very high
- (b) Moderate
- (c) Very low
- (d) Infinite

Answer: C) Very low

2425. The current gain (β) in a CB amplifier is approximately:

- (a) < 1
- (b) Equal to 1
- (c) Much greater than 1
- (d) Infinite

Answer: A) < 1

2426. CB amplifiers are mainly used for:

- (a) High input impedance
- (b) High voltage amplification
- (c) High-frequency applications
- (d) Low-frequency filtering

Answer: C) High-frequency applications

2427. The voltage gain of a CC amplifier is approximately:

- (a) >100
- (b) 0
- (c) 1
- (d) Infinity

Answer: C) 1

2428. CC amplifiers are typically used as:

- (a) Oscillators
- (b) Voltage amplifiers
- (c) Buffers or impedance matching stages
- (d) Filters

Answer: C) Buffers or impedance matching stages

2429. The phase shift between input and output in a CC amplifier is:

- (a) 0°
- (b) 90°
- (c) 180°
- (d) 360°

Answer: A) 0°

2430. Which configuration provides the highest voltage gain?

- (a) CE
- (b) CB
- (c) CC
- (d) None

Answer: A) CE

2431. Which configuration has the highest input impedance?

- (a) CB
- (b) CE
- (c) CC
- (d) All equal

Answer: C)

2432. Which configuration is best suited for impedance matching?

- (a) Common Emitter
- (b) Common Base
- (c) Common Collector
- (d) All of the above

Answer: C) Common Collector

2433. In Amplifiers, Transformer coupling is often used when:

- (a) High voltage gain is required
- (b) Large DC biasing is needed
- (c) High-frequency signals are involved
- (d) High current gain is required

Answer: C) High-frequency signals are involved

2434. The main advantage of transformer coupling in amplifier configuration is:

- (a) Simplicity in design
- (b) Very low cost
- (c) Improved impedance matching
- (d) High gain with no distortion

Answer: C) Improved impedance matching

2435. The overall voltage gain of a multistage amplifier is:

- (a) The sum of the gains of each stage
- (b) The product of the gains of each stage
- (c) The average of the gains of each stage
- (d) The maximum gain of any one stage

Answer: B) The product of the gains of each stage

2436. The frequency response of a multistage amplifier can be improved by:

- (a) Decreasing the size of the coupling capacitors
- (b) Using larger resistors in the circuit
- (c) Ensuring the stages have similar bandwidths
- (d) Increasing the number of stages

Answer: C) Ensuring the stages have similar bandwidths

2437. Negative feedback in amplifiers:

- (a) Increases distortion
- (b) Reduces gain
- (c) Reduces bandwidth
- (d) Causes oscillation

Answer: B) Reduces gain

2438. The main benefit of negative feedback is:

- (a) More noise
- (b) Higher cost
- (c) Improved stability and bandwidth
- (d) Higher input impedance only

Answer: C) Improved stability and bandwidth

2439. A differential amplifier amplifies:

- (a) The average of two inputs
- (b) The sum of two inputs
- (c) The difference between two inputs
- (d) Only the first input

Answer: C) The difference between two inputs

2440. A high CMRR in a differential amplifier means:

- (a) Good rejection of common signals
- (b) High output power
- (c) Low bandwidth
- (d) Unstable gain

Answer: A) Good rejection of common signals

2441. In a differential amplifier, if the input signals are identical, the output will be:

- (a) Zero
- (b) Amplified
- (c) A direct copy of the input
- (d) Inverted

Answer: A) Zero

2442. The main use of a differential amplifier is in:

- (a) Audio amplification
- (b) Measuring the difference between two voltages
- (c) Filtering high-frequency noise
- (d) Digital signal processing

Answer: B) Measuring the difference between two voltages

2443. The gain of a differential amplifier is:

- (a) Constant for all input voltages
- (b) Independent of the signal frequency
- (c) Proportional to the difference between the inputs
- (d) Dependent on the output impedance

Answer: C) Proportional to the difference between the inputs

2444. A higher CMRR indicates:

- (a) The amplifier is more sensitive to common-mode signals
- (b) The amplifier is less sensitive to common-mode signals
- (c) The amplifier has low voltage gain
- (d) The amplifier works better with digital signals

Answer: B) The amplifier is less sensitive to common-mode signals

2445. A typical application of differential amplifiers with high CMRR is:

- (a) Power amplifiers
- (b) Instrumentation amplifiers
- (c) Audio signal processing
- (d) Digital logic circuits

Answer: B) Instrumentation amplifiers

2446. The CMRR value for an ideal differential amplifier is:

- (a) 1
- (b) Infinite
- (c) 0
- (d) 100

Answer: B) Infinite

2447. A basic operational amplifier (Op-Amp) has:

- (a) High input impedance and low output impedance
- (b) Low input impedance and high output impedance
- (c) Low input and output impedance
- (d) Equal input and output impedance

Answer: A) High input impedance and low output impedance

2448. The voltage gain of an ideal Op-Amp is:

- (a) Zero
- (b) Finite but very high
- (c) Infinite
- (d) Dependent on the frequency

Answer: C) Infinite

2449. In a non-inverting amplifier configuration, the input signal is applied to the:

- (a) Inverting terminal
- (b) Non-inverting terminal
- (c) Both terminals equally
- (d) Ground

Answer: B) Non-inverting terminal

2450. Which of the following is a key characteristic of an ideal operational amplifier?

- (a) Infinite bandwidth
- (b) Zero input offset voltage
- (c) Infinite open-loop gain
- (d) All of the above

Answer: D) All of the above

2451. Which of the following uses amplifiers extensively?

- (a) Cooking appliances
- (b) Thermostats
- (c) Audio systems
- (d) Washing machines

Answer: C) Audio systems

2452. Amplifiers are used in communication systems for:

- (a) Interference
- (b) Attenuation
- (c) Signal boosting
- (d) Filtering only

Answer: C) Signal boosting

2453. Which amplifier is commonly used at the transmitting end of communication systems?

- (a) Power amplifier
- (b) Buffer amplifier
- (c) Audio amplifier
- (d) Op-amp

Answer: A) Power amplifier

2454. What is the main function of an oscillator?

- (a) Amplify a signal
- (b) Convert DC to AC without input signal
- (c) Rectify AC
- (d) Store electric energy

Answer: B) Convert DC to AC without input signal

2455. An oscillator differs from an amplifier because:

- (a) It consumes more power
- (b) It does not require feedback
- (c) It generates its own input signal
- (d) It only works with AC supply

Answer: C) It generates its own input signal

2456. Which of the following waveforms is typically produced by a sinusoidal oscillator?

- (a) Square wave
- (b) Sine wave
- (c) Sawtooth wave
- (d) Pulse wave Answer:
B) Sine wave

2457. What type of waveform does a relaxation oscillator usually produce?

- (a) Sinusoidal
- (b) Triangular
- (c) Square or sawtooth
- (d) Continuous DC

Answer: C) Square or sawtooth

2458. The purpose of feedback in an oscillator is to:

- (a) Increase the gain
- (b) Produce stable DC output
- (c) Maintain sustained oscillations
- (d) Filter noise

Answer: C) Maintain sustained oscillations

2459. Which of the following is a sinusoidal oscillator?

- (a) Astable multivibrator
- (b) Colpitts oscillator
- (c) Schmitt trigger
- (d) Square wave generator Answer: B) Colpitts oscillator

2460. An oscillator that generates square waves is classified as:

- (a) Sinusoidal oscillator
- (b) Relaxation oscillator
- (c) Harmonic oscillator
- (d) Linear oscillator

Answer: B) Relaxation oscillator

2461. What type of feedback is used in oscillators to sustain oscillations?

- (a) Negative feedback
- (b) Positive feedback
- (c) No feedback
- (d) Dual feedback

Answer: B) Positive feedback

2462. Which of the following frequency ranges corresponds to RF oscillators?

- (a) Below 20 Hz
- (b) 20 Hz – 20 kHz
- (c) 20 kHz – 300 GHz
- (d) Above 1 THz

Answer: C) 20 kHz – 300 GHz

2463. An oscillator operating at audio frequencies typically covers:

- (a) 1 Hz – 10 Hz
- (b) 20 Hz – 20 kHz
- (c) 100 kHz – 1 MHz
- (d) 1 MHz – 100 MHz

Answer: B) 20 Hz – 20 kHz

2464. An example of an oscillator that uses **positive feedback** is:

- (a) RC phase shift oscillator
- (b) Hartley oscillator
- (c) Voltage-controlled oscillator (VCO)
- (d) All of the above

Answer: D) All of the above

2465. What is the primary difference between positive feedback and negative feedback in oscillators?

- (a) Positive feedback amplifies the signal, while negative feedback reduces it.
- (b) Positive feedback & negative feedback destabilizes oscillations.
- (c) Positive feedback decreases the gain, while negative feedback increases it.
- (d) Negative feedback increases the amplitude, while positive feedback reduces it.

Answer: A) Positive feedback amplifies the signal, while negative feedback reduces it.

2466. Which of the following is a key requirement for sustained oscillations in an oscillator circuit?

- (a) Zero loop gain
- (b) Negative feedback
- (c) Positive feedback with the correct phase shift
- (d) Amplifier with an infinite gain

Answer: C) Positive feedback with the correct phase shift

2467. According to the **Barkhausen criterion**, the total phase shift around the feedback loop for oscillators must be:

- (a) 90°
- (b) 180°
- (c) 360° (or 0°)
- (d) 270°

Answer: C) 360° (or 0°)

2468. The **Barkhausen criterion** states that for an oscillator to start and sustain, the loop gain must be:

- (a) Greater than 1
- (b) Equal to 1
- (c) Less than 1
- (d) Equal to 0

Answer: B) Equal to 1

2469. Which of the following components are typically used to achieve the correct **phase shift** for oscillations?

- (a) Resistors and capacitors
- (b) Inductors and resistors
- (c) Capacitors and operational amplifiers
- (d) Both inductors and capacitors

Answer: A) Resistors and capacitors

2470. For an oscillator to function, the **loop gain** (product of amplifier gain and feedback network gain) must be:

- (a) Always less than 1
- (b) Exactly 1
- (c) Greater than 1
- (d) Always equal to 0

Answer: B) Exactly 1

2471. What is the significance of the **phase shift** in oscillator circuits?

- (a) It determines the waveform type (sinusoidal or square).
- (b) It controls the frequency of the oscillation.
- (c) It ensures that the feedback signal reinforces the input signal.
- (d) It determines the amplitude of the output signal.

Answer: C) It ensures that the feedback signal reinforces the input signal.

2472. The phase shift requirement for a **Wien bridge oscillator** is:

- (a) 180°
- (b) 90°
- (c) 360° (0°)
- (d) 270°

Answer: C) 360° (0°)

2473. The loop gain condition for oscillation is that the total gain in the feedback loop must be:

- (a) Less than 1 to avoid distortion
- (b) Exactly 1 to maintain oscillations
- (c) Equal to infinity to generate a high output
- (d) Negative to stop oscillations

Answer: B) Exactly 1 to maintain oscillations

2474. In a **Colpitts oscillator**, the total phase shift at the frequency of oscillation is:

- (a) 180°
- (b) 360°
- (c) 90°
- (d) 270°

Answer: B) 360°

2475. The **Barkhausen criterion** helps in determining:

- (a) The minimum voltage required for the oscillator to start
- (b) The phase shift conditions for the oscillator
- (c) The stability of the oscillator
- (d) The frequency range of the oscillator

Answer: B) The phase shift conditions for the oscillator

2476. Which of the following is the main component of a Wien Bridge Oscillator?

- (a) Inductor
- (b) Capacitor
- (c) Resistor
- (d) Both resistors and capacitors

Answer: D) Both resistors and capacitors

2477. The frequency of oscillation for a Wien Bridge Oscillator is determined by:

- (a) The gain of the amplifier only
- (b) The feedback network resistors and capacitors
- (c) The power supply voltage
- (d) The size of the inductor

Answer: B) The feedback network resistors and capacitors

2478. In a Colpitts Oscillator, the feedback network consists of:

- (a) Two capacitors and one inductor
- (b) One capacitor and two inductors
- (c) One resistor and one capacitor
- (d) Two inductors and one capacitor

Answer: A) Two capacitors and one inductor

2479. The Hartley Oscillator is different from the Colpitts oscillator because it uses:

- (a) A resistor-capacitor network for feedback
- (b) An inductive voltage divider for feedback
- (c) A single inductor and two capacitors for feedback
- (d) A combination of resistors and inductors

Answer: B) An inductive voltage divider for feedback

2480. Which of the following is a characteristic of the RC Phase Shift Oscillator?

- (a) Uses only inductors for feedback
- (b) Provides a high-frequency output
- (c) Requires three RC stages for a total phase shift of 180°
- (d) The frequency of oscillation is determined only by resistors

Answer: C) Requires three RC stages for a total phase shift of 180°

2481. The output waveform of a sinusoidal oscillator is generally:

- (a) Square wave
- (b) Sine wave
- (c) Triangular wave
- (d) Sawtooth wave

Answer: B) Sine wave

2482. The frequency of oscillation of a Colpitts Oscillator is determined by:

- (a) The values of the capacitors and the inductor in the tank circuit
- (b) The power supply voltage
- (c) The resistor in the feedback network
- (d) The gain of the operational amplifier

Answer: A) The values of the capacitors and the inductor in the tank circuit

2483. In a Wien Bridge Oscillator, the circuit stabilizes the amplitude of the oscillations by:

- (a) Automatic gain control
- (b) Variable resistors in the feedback loop
- (c) Fixed capacitors
- (d) Increasing the gain continuously

Answer: A) Automatic gain control

2484. The condition for sustained oscillations in a Colpitts Oscillator is that the phase shift around the feedback loop must be:

- (a) 180°
- (b) 360°
- (c) 90°
- (d) 270°

Answer: B) 360°

2485. The RC Phase Shift Oscillator is often used for:

- (a) High-frequency RF applications
- (b) Low-frequency signal generation
- (c) Digital clock generation
- (d) Modulation and demodulation

Answer: B) Low-frequency signal generation

2486. The Colpitts oscillator is a type of:

- (a) RC oscillator
- (b) LC oscillator
- (c) Crystal oscillator
- (d) Relaxation oscillator

Answer: B) LC oscillator

2487. In an **inductive proximity sensor**, the **oscillator's** role is to:

- (a) Detect objects without generating a signal
- (b) Create a magnetic field that is altered when a metal object enters the field
- (c) Convert the object's position into a digital signal
- (d) Regulate the sensitivity of the sensor to temperature

Answer: B) Create a magnetic field that is altered when a metal object enters the field

2488. Which of the following is an advantage of the **RC Phase Shift Oscillator**?

- (a) It can operate at high frequencies
- (b) It is easy to design and build
- (c) It requires a complex feedback network
- (d) It uses a crystal for frequency stability

Answer: B) It is easy to design and build

2489. The **Hartley Oscillator** is primarily classified as a:

- (a) RC oscillator
- (b) LC oscillator
- (c) Crystal oscillator
- (d) Relaxation oscillator

Answer: B) LC oscillator

2490. The **frequency of oscillation** in a **Hartley Oscillator** is determined by:

- (a) The values of the resistors and capacitors
- (b) The inductance and capacitance in the feedback network
- (c) The feedback phase shift
- (d) The gain of the amplifier

Answer: B) The inductance and capacitance in the feedback network

2491. The feedback network in a **Hartley Oscillator** is based on:

- (a) A capacitive divider
- (b) A resistive divider
- (c) An inductive voltage divider
- (d) A combination of resistors and capacitors

Answer: C) An inductive voltage divider

2492. A **crystal oscillator** typically uses a **piezoelectric crystal**. The piezoelectric effect is used to:

- (a) Amplify the signal
- (b) Convert mechanical vibrations into an electrical signal
- (c) Regulate the current through the oscillator
- (d) Create the feedback network

Answer: B) Convert mechanical vibrations into an electrical signal

2493. Which of the following is the most commonly used material for crystals in oscillators?

- (a) Quartz
- (b) Sapphire
- (c) Gallium arsenide
- (d) Silicon carbide

Answer: A) Quartz

2494. The **fundamental frequency** of a **crystal oscillator** is determined by:

- (a) The size and shape of the crystal
- (b) The temperature of the oscillator
- (c) The gain of the oscillator circuit
- (d) The resonant frequency of the amplifier

Answer: A) The size and shape of the crystal

2495. Which of the following oscillators provides the most **stable frequency output**?

- (a) RC Oscillator
- (b) LC Oscillator
- (c) Crystal Oscillator
- (d) Hartley Oscillator

Answer: C) Crystal Oscillator

2496. The **Wein Bridge Oscillator** is primarily used for generating:

- (a) High-frequency RF signals
- (b) Low-frequency audio signals
- (c) Microwave signals
- (d) Square waves

Answer: B) Low-frequency audio signals

2497. Which oscillator type is typically used in **audio frequency** applications?

- (a) Crystal Oscillator
- (b) Wein Bridge Oscillator
- (c) LC Oscillator
- (d) Hartley Oscillator

Answer: B) Wein Bridge Oscillator

2498. The **Hartley Oscillator** uses which of the following components to determine the frequency?

- (a) A crystal
- (b) A capacitor and an inductor
- (c) An operational amplifier
- (d) A resistor and a capacitor

Answer: B) A capacitor and an inductor

2499. The **Crystal Oscillator** is commonly used for:

- (a) Low-frequency signal generation
- (b) High-precision clock generation
- (c) Amplification
- (d) Modulation and demodulation

Answer: B) High-precision clock generation

2500. Which oscillator type requires an **operational amplifier** to control gain for sustained oscillations?

- (a) Hartley Oscillator
- (b) Wein Bridge Oscillator
- (c) Colpitts Oscillator
- (d) RC Phase Shift Oscillator

Answer: B) Wein Bridge Oscillator

2501. In an **LC Oscillator**, the frequency is determined by:

- (a) The size and shape of the crystal
- (b) The inductance and capacitance in the circuit
- (c) The gain of the operational amplifier
- (d) The resistor values in the network

Answer: B) The inductance and capacitance in the circuit

2502. Which of the following is true for a **Wein Bridge Oscillator**?

- (a) It is used for generating very high frequencies
- (b) It uses an op-amp and a feedback network to generate sine waves
- (c) It is primarily used in RF communication
- (d) It requires a crystal for frequency determination

Answer: B) It uses an op-amp and a feedback network to generate sine waves

2503. The **RC Phase Shift Oscillator** is primarily used for:

- (a) Audio signal generation
- (b) High-frequency RF applications
- (c) Microwave signal generation
- (d) Communication systems

Answer: A) Audio signal generation

2504. Which oscillator is considered **most stable** for generating a **high-precision frequency** over time?

- (a) RC Oscillator
- (b) Hartley Oscillator
- (c) Colpitts Oscillator
- (d) Crystal Oscillator

Answer: D) Crystal Oscillator

2505. Which of the following is a typical application of a **Schmitt Trigger Oscillator**?

- (a) Audio frequency generation
- (b) Timing circuits
- (c) High-frequency signal generation
- (d) Digital signal amplification

Answer: B) Timing circuits

2506. In a **Relaxation Oscillator**, the output waveform is typically:

- (a) Sine wave
- (b) Triangular wave
- (c) Square wave
- (d) Sawtooth wave

Answer: C) Square wave

2507. Oscillators are used in function generators primarily to:

- (a) Store digital data
- (b) Generate periodic waveforms like sine, square, and triangle
- (c) Amplify weak signals
- (d) Rectify AC signals

Answer: B) Generate periodic waveforms like sine, square, and triangle

2508. In communication systems, oscillators are essential for:

- (a) Battery charging
- (b) Frequency modulation and demodulation
- (c) File storage
- (d) Signal distortion

Answer: B) Frequency modulation and demodulation

2509. Which type of oscillator is commonly used in radio transmitters for carrier wave generation?

- (a) RC Oscillator
- (b) LC Oscillator
- (c) Wein Bridge Oscillator
- (d) Schmitt Trigger Oscillator

Answer: B) LC Oscillator

2510. In digital systems, oscillators are mainly used to:

- (a) Perform arithmetic operations
- (b) Provide timing or clock signals
- (c) Encode data
- (d) Increase power output

Answer: B) Provide timing or clock signals

2511. The clock oscillator in a digital system provides:

- (a) A DC voltage reference
- (b) A time-varying control voltage
- (c) A stable timing signal to synchronize data flow
- (d) A memory refresh circuit

Answer: C) A stable timing signal to synchronize data flow

2512. Which of the following oscillator types is best suited for stable clock generation in microcontrollers?

- (a) Hartley Oscillator
 - (b) RC Phase Shift Oscillator
 - (c) Crystal Oscillator
 - (d) Colpitts Oscillator
- Answer: C) Crystal Oscillator

2513. Function generators rely on oscillators to:

- (a) Demodulate RF signals
- (b) Produce variable frequency and waveform signals
- (c) Filter DC from AC
- (d) Increase transmission power

Answer: B) Produce variable frequency and waveform signals

2514. A Crystal Oscillator is preferred in communication receivers because of its:

- (a) Low cost
- (b) High output power
- (c) High frequency stability
- (d) Low voltage requirement

Answer: C) High frequency stability

2515. Oscillators used in timing circuits are required to have:

- (a) Adjustable phase shift
- (b) Frequency stability over time
- (c) High amplitude gain
- (d) High power dissipation

Answer: B) Frequency stability over time

2516. The oscillator in a wireless transmitter helps in:

- (a) Cleaning the signal
- (b) Amplifying the modulated signal
- (c) Generating the carrier signal
- (d) Receiving remote data

Answer: C) Generating the carrier signal

2517. The **Quality Factor (Q)** of an oscillator is a measure of:

- (a) Power output
- (b) Input resistance
- (c) Frequency selectivity and energy loss
- (d) Temperature coefficient

Answer: C) Frequency selectivity and energy loss

2518. A **high-Q oscillator** is desirable because it:

- (a) Consumes more power
- (b) Has higher waveform distortion
- (c) Produces purer sine waves with narrow bandwidth
- (d) Is easier to tune

Answer: C) Produces purer sine waves with narrow bandwidth

2181. Which logic gate gives a HIGH output only when both inputs are HIGH?

- a) OR
- b) AND
- c) XOR
- d) NOT

Answer: b) AND

2182. The output of a NOT gate is:

- a) Always HIGH
- b) Always LOW
- c) Same as input
- d) Complement of input

Answer: d) Complement of input

2183. Which of the following is a universal gate?

- a) AND
- b) OR
- c) NOT
- d) NAND

Answer: d) NAND

2184. What is the output of an OR gate when both inputs are LOW?

- a) HIGH
- b) LOW
- c) Same as input
- d) Cannot be determined

Answer: b) LOW

2185. Which gate has the output true only when the inputs are different?

- a) XNOR
- b) XOR
- c) NAND
- d) NOR

Answer: b) XOR

2186. The Boolean expression for a NOR gate is:

- a) $A + B$
- b) $(A + B)'$
- c) AB
- d) $(AB)'$

Answer: b) $(A + B)'$

2187. How many possible input combinations exist for a 3-input AND gate?

- a) 4
- b) 6
- c) 8
- d) 16

Answer: c) 8

2188. What logic gate is represented by the equation $Y = A \oplus B$?

- a) AND
- b) XOR
- c) NOR
- d) NAND

Answer: b) XOR

2189. Which gate is equivalent to an AND gate followed by a NOT gate?

- a) OR
- b) NAND
- c) NOR
- d) XOR

Answer: b) NAND

2190. The IC number for a quad 2-input AND gate is:

- a) 7400
- b) 7408
- c) 7432
- d) 7486

Answer: b) 7408

2191. Which of the following logic gates can be used to implement all other logic gates?

- a) AND and OR
- b) NOT and AND
- c) XOR and XNOR
- d) NAND and NOR

Answer: d) NAND and NOR

2192. gate is equivalent to an AND gate followed by a:

- a) NOR gate
- b) OR gate
- c) NOT gate
- d) XOR gate

Answer: c) NOT gate

2193. What will be the output of a NAND gate if both inputs are HIGH?

- a) HIGH
- b) LOW
- c) Same as input
- d) Indeterminate

Answer: b) LOW

2194. How can a NOT gate be constructed using a NAND gate?

- a) Connect both inputs together
- b) Connect output to one input
- c) Leave one input open
- d) Use an AND gate in series

Answer: a) Connect both inputs together

2195. A NOR gate gives HIGH output only when:

- a) All inputs are LOW
 - b) All inputs are HIGH
 - c) One input is HIGH
 - d) Both inputs are different
- Answer:
- a) All inputs are LOW

2196. Which logic gate is formed by inverting the output of an OR gate?

- a) NOR
- b) NAND
- c) XOR
- d) XNOR

Answer: a) NOR

2197. Which gate has the Boolean expression $Y = (A \cdot B)'$?

- a) NOR
- b) NAND
- c) XOR
- d) OR

Answer: b) NAND

2198. To create an AND gate using only NAND gates, the minimum number of NAND gates required is:

- a) 1
- b) 2
- c) 3
- d) 4

Answer: c) 3

2199. The Boolean expression for a NOR gate is:

- a) $A + B$
- b) $(A \cdot B)'$
- c) $(A + B)'$
- d) $A' + B'$

Answer: c) $(A + B)'$

2200. Which gate is formed when the output of a NOR gate is inverted?

- a) NAND
- b) AND
- c) OR
- d) NOT

Answer: c) OR

2201. Why are NAND and NOR gates called universal gates?

- a) They are found in all digital devices
- b) They are easier to design than other gates
- c) Any digital circuit can be built using only NAND or only NOR gates
- d) They consume less power

Answer: c) Any digital circuit can be built using only NAND or only NOR gates

2202. Which feature makes a logic gate “universal”?

- a) It can operate without power
- b) It can replicate all basic logic gates (AND, OR, NOT)
- c) It provides faster switching
- d) It requires only one input

Answer: b) It can replicate all basic logic gates (AND, OR, NOT)

2203. What is the primary reason NAND gates are widely used in digital electronics?

- a) They are slower but cheaper
- b) They produce analog signals
- c) They can be used to build all other logic gates
- d) They require less voltage

Answer: c) They can be used to build all other logic gates

2204. Which of the following is not true about universal gates?

- a) NAND and NOR can form XOR and XNOR gates
 - b) NAND gates alone can create all basic gates
 - c) NOR gates cannot produce NOT operation
 - d) Universal gates can implement any Boolean function
- Answer: c) NOR gates cannot produce NOT operation

2205. The universality of NAND and NOR gates means:

- a) They have unlimited inputs
- b) They follow analog principles
- c) They can be used to design any combinational logic circuit
- d) They work at any voltage

Answer: c) They can be used to design any combinational logic circuit

2206. The output of an XNOR gate is HIGH when:

- a) Both inputs are HIGH
- b) Both inputs are LOW
- c) Inputs are unequal
- d) Inputs are equal

Answer: c) Inputs are unequal

2207. The Boolean expression for a 2-input XOR gate is:

- a) AB
- b) $A + B$
- c) $A'B + AB'$
- d) $AB + A'B'$

Answer: c) $A'B + AB'$

2208. What is the output of an XNOR gate when both inputs are HIGH?

- a) HIGH
- b) LOW
- c) Same as input A
- d) Opposite of

XOR Answer: a)
HIGH

2209. Which gate is called the "inequality detector"?

- a) XOR
- b) AND
- c) XNOR
- d) NOR

Answer: a) XOR

2210. Which gate gives a HIGH output only when both inputs are equal?

- a) XOR
- b) NAND
- c) NOR
- d) XNOR

Answer: d) XNOR

2211. What is the Boolean expression for a 2-input XNOR gate?

- a) $A'B + AB'$
- b) $AB + A'B'$
- c) AB
- d) $(A + B)'$

Answer: b) $AB + A'B'$

2212. What is the output of a 2-input XOR gate when both inputs are 1?

- a) 1
- b) 0
- c) Undefined
- d) Same as input

Answer: b) 0

2213. In which of the following applications is the XOR gate commonly used?

- a) Buffer
- b) Decoder
- c) Parity checker
- d) Flip-flop

Answer: c) Parity checker

2214. What is the output of a 2-input XNOR gate when one input is 1 and the other is 0?

- a) 1
- b) 0
- c) Same as first input
- d) Cannot be determined

Answer: b) 0

2215. The XNOR gate is also known as the:

- a) Equality gate
- b) Odd function gate
- c) Comparator gate
- d) Inequality gate

Answer: a) Equality gate

2216. What logic gate is implemented by IC 7400?

- a) AND
- b) OR
- c) NAND
- d) NOR

Answer: c) NAND

2217. Which of the following ICs contains quad 2-input OR gates?

- a) 7402
- b) 7432
- c) 7408
- d) 7486

Answer: b) 7432

2218. What is the function of IC 7408?

- a) Quad 2-input OR gate
- b) Quad 2-input AND gate
- c) Quad 2-input NAND gate
- d) Dual 4-input AND gate

Answer: b) Quad 2-input AND gate

2219. The IC 7402 is used to implement which logic gate?

- a) NAND
- b) NOR
- c) AND
- d) XOR

Answer: b) NOR

2220. IC 7486 consists of how many XOR gates?

- a) 2
- b) 3
- c) 4
- d) 8

Answer: c) 4

2221. Which IC is used for the XNOR gate in the 74 series family?

- a) 74266
- b) 7486
- c) 7402
- d) 7432

Answer: a) 74266

2222. The 7400 series ICs operate typically on which voltage?

- a) 1.5V
- b) 3.3V
- c) 5V
- d) 9V

Answer: c) 5V

2223. How many gates are inside the IC 7400?

- a) 2
- b) 3
- c) 4
- d) 6

Answer: c) 4(Quad 2-input NAND gates)

2224. In IC 7408, how many pins are generally used for inputs?

- a) 4
- b) 8
- c) 6
- d) 10

Answer: b) 8(Each of the 4 AND gates has 2 inputs)

2225. What is the use of pin 14 in most 7400-series ICs?

- a) Ground
- b) Output
- c) Vcc (Power supply)
- d) Input

Answer: c) Vcc (Power supply)

2226. Which IC provides six NOT gates in one package?

- a) 7400
- b) 7408
- c) 7404
- d) 7432

Answer: c) 7404

2227. How many NOT gates are in IC 7404?

- a) 4
- b) 6
- c) 2
- d) 8

Answer: b) 6

2228. What logic function does IC 7404 perform?

- a) AND
- b) OR
- c) NOR
- d) NOT

Answer: d) NOT

2229. What is the standard supply voltage for 7404 IC?

- a) 3.3V
- b) 6V
- c) 5V
- d) 9V

Answer: c) 5V

2230. What is the typical package type of the 7404 IC?

- a) TO-92
- b) DIP-14
- c) QFN
- d) BGA

Answer: b) DIP-14

2231. Which IC is used to implement XOR gates in the 7400 series?

- a) 7400
- b) 7432
- c) 7486
- d) 7404

Answer: c) 7486

2232. How many XOR gates are present in IC 7486?

- a) 2
- b) 3
- c) 4
- d) 6

Answer: c) 4

2233. What is the Boolean expression implemented by each gate in IC 7486?

- a) $A + B$
- b) AB
- c) $A'B + AB'$
- d) $AB + A'B'$

Answer: c) $A'B + AB'$

2234. What is the typical package type of IC 7486?

- a) TO-220
- b) DIP-14
- c) SIP
- d) BGA

Answer: b) DIP-14

2235. What is the logic output of an XOR gate when both inputs are LOW?

- a) LOW
 - b) HIGH
 - c) Undefined
 - d) High impedance
- Answer: a) LOW

2236. A water tank should fill only if the pump is ON and the tank is NOT FULL. Which gate combination is best suited?

- a) OR gate
- b) AND + NOT
- c) NAND
- d) NOR

Answer: b) AND + NOT

2237. An automatic door should open if any one of the sensors (A or B) is triggered. Which logic gate should be used?

- a) AND
- b) XNOR
- c) OR
- d) XOR

Answer: c) OR

2238. A fire alarm sounds only when both smoke and heat are detected. Which gate should be used?

- a) OR
- b) XOR
- c) AND
- d) XNOR

Answer: c) AND

2239. A security light turns ON when it is dark AND movement is detected. What logic gate is used?

- a) OR
- b) AND
- c) XOR
- d) XNOR

Answer: b) AND

2240. You have two switches A and B. A light should turn ON only when exactly one switch is ON. Which gate is needed?

- a) AND
- b) OR
- c) XOR
- d) NAND

Answer: c) XOR

2241. If $A = 1$ and $B = 0$, what is the output of a NOR gate?

- a) 0
- b) 1
- c) Cannot be determined
- d) Same as A

Answer: a) 0

2242. If inputs to a NAND gate are both HIGH, what is the output?

- a) LOW
- b) HIGH
- c) Undefined
- d) Depends on previous output

Answer: a) LOW

2243. You want an output that is HIGH only when both A and B are NOT equal. Which gate should be used?

- a) OR
- b) XNOR
- c) XOR
- d) AND

Answer: c) XOR

2244. Which of the following gate(s) can be used to build a parity checker circuit?

- a) AND
- b) NAND
- c) XOR
- d) NOR

Answer: c) XOR

2245. In a PLC ladder diagram, an AND logic is implemented by:

- a) Parallel contacts
- b) Series contacts
- c) Timer blocks
- d) Relay coils

Answer: b) Series contacts

2246. Which logic gate is best for turning ON a motor only when two sensors are activated?

- a) OR
- b) AND
- c) NOT
- d) XOR

Answer: b) AND

2247. In PLCs, a normally closed contact behaves like which logic gate?

- a) OR
- b) AND
- c) NOT
- d) XOR

Answer: c) NOT

2248. Which logic gate is most suitable for a parity bit generator in communication systems?

- a) NAND
- b) XOR
- c) AND
- d) NOR

Answer: b) XOR

2249. In a digital security system, the door opens when either code A OR fingerprint B is accepted. What gate is used?

- a) AND
- b) NOT
- c) XOR
- d) OR

Answer: d) OR

2250. In a PLC, how is an AND function implemented in a ladder diagram?

- a) By using two parallel contacts
- b) By using two series contacts
- c) By using a relay coil
- d) By using a timer block

Answer: b) By using two series contacts

2251. Which of the following gates is typically used to implement a decision-making function in a logic control system, where output is HIGH if either of the conditions is true?

- a) AND
- b) OR
- c) NOT
- d) XOR

Answer: b) OR

2252. A NOT gate function in PLC can be implemented using:

- a) Normally open contact
- b) Normally closed contact
- c) Two series contacts
- d) A parallel coil

Answer: b) Normally closed contact

2253. In control system for industrial conveyor system, which logic gate functionality would be used to activate the conveyor when both conditions (sensor A and sensor B) are met?

- a) AND
- b) OR
- c) NAND
- d) XOR

Answer: a) AND

2254. In a ladder logic program, how is an OR function implemented?

- a) Using a series of contacts
- b) Using contacts in parallel
- c) Using a single normally open contact
- d) Using relay outputs

Answer: b) Using contacts in parallel

2255. In a elevator control system, which logic gate(only one)can be used to ensure that the elevator only operates if both the "button pressed" signal and "motor running" signal are true?

- a) AND
- b) OR
- c) NAND
- d) NOT

Answer: a) AND

2256. Which logic gate (one number) is used in a control system for an alarm that triggers when both conditions (sensor A and sensor B) are not met?

- a) NAND
- b) NOR
- c) XOR
- d) AND

Answer: a) NAND

2257. In a security system, the alarm should trigger when both the door sensor and motion sensor are triggered. Which gate is used in the to achieve this logic?

- a) OR
- b) AND
- c) XOR
- d) NAND

Answer: b) AND

2258. A conveyor belt system should turn ON if either the material is detected OR the start button is pressed. Which logic configuration is required?

- a) AND
- b) OR
- c) NOT
- d) XOR

Answer: b) OR

2259. In a control system for a light that should be turned ON only when not only the door is closed, but also the light switch is ON, which gate is used?

- a) AND
- b) OR
- c) NOT
- d) XOR

Answer: a) AND

2260. A controlled heating system should turn ON if the room temperature is below a threshold AND the user has selected the heating mode. What logic gate is used?

- a) AND
- b) OR
- c) XOR
- d) NOT

Answer: a) AND

2261. A temperature monitoring system should raise an alarm when the temperature exceeds the threshold OR the pressure exceeds the threshold. Which gate would be used to implement this ?

- a) AND
- b) OR
- c) XOR
- d) NOT

Answer: b) OR

2262. In a control system, a motor should start only when both the start button is pressed AND the safety guard is closed. Which logic gate would best describe this behavior?

- a) NOR
- b) XOR
- c) AND
- d) OR

Answer: c) AND

2263. A security system in requires both the correct PIN code and fingerprint match for the door to open. Which gate logic is most appropriate?

- a) AND
- b) OR
- c) XOR
- d) NOR

Answer: a) AND

2264. In a temperature control system, a cooling fan should turn ON when the temperature sensor reads above the threshold AND the fan switch is ON. Which logic gate is used?

- a) XOR
- b) AND
- c) OR
- d) NOT

Answer: b) AND

2265. A control system is designed to activate an alarm when both smoke is detected or the system is in test mode. What type of logic gate would best accomplish this?

- a) AND
- b) OR
- c) NOT
- d) XOR

Answer: b) OR

2266. In a PLC-based elevator system, the elevator should only operate if the floor is requested AND the button is pressed. Which logic gate functionality is used?

- a) OR
- b) AND
- c) NOT
- d) XOR

Answer: b) AND

2267. A microcontroller is best described as:

- a) A CPU only
- b) A complete system with CPU, memory, and I/O ports on a single chip
- c) A memory chip
- d) An input/output device

Answer: b) A complete system with CPU, memory, and I/O ports on a single chip

2268. Which of the following is true for a microprocessor?

- a) It has built-in RAM and ROM
- b) It is mainly used for control-based applications
- c) It requires external components for memory and I/O
- d) It works independently without any peripherals

Answer: c) It requires external components for memory and I/O

2269. Which of these applications typically uses a microcontroller?

- a) Desktop computer
- b) Washing machine
- c) Laptop
- d) Server

Answer: b) Washing machine

2270. Which of the following is NOT a characteristic of microcontrollers?

- a) Embedded in control-oriented applications
- b) Lower power consumption
- c) Requires external I/O modules for basic operation
- d) Used in real-time systems

Answer: c) Requires external I/O modules for basic operation

2271. An 8051 is an example of a:

- a) Microprocessor
- b) Microcontroller
- c) Input
- d) Memory

Answer: b) Microcontroller

2272. The main focus of microcontrollers is:

- a) Number crunching
- b) Memory management
- c) Peripheral control and real-time response
- d) High-speed gaming

Answer: c) Peripheral control and real-time response

2273. Which component is usually NOT integrated in a basic microprocessor?

- a) ALU
- b) RAM
- c) ROM
- d) I/O Ports

Answer: b) RAM, c) ROM, and d) I/O Ports are usually external in microprocessors.

2274. The main components of a microprocessor are:

- a) Monitor and keyboard
- b) ALU, control unit, registers
- c) RAM and ROM
- d) Hard disk and USB ports

Answer: b) ALU, control unit, registers

2275. Which of the following is a **16-bit** microprocessor?

- a) Intel 4004
- b) Intel 8085
- c) Intel 8086
- d) Intel Pentium

Answer: c) Intel 8086

2276. Which of the following devices typically uses a microcontroller for control of main functionality?

- a) Desktop PC
- b) Washing machine
- c) Server
- d) Laptop

2277. What is the word length of the 8085 microprocessor?

- a) 4-bit
- b) 8-bit
- c) 16-bit
- d) 32-bit

Answer: b) 8-bit

2278. Which register holds the memory address of the next instruction to be executed?

- a) Stack Pointer
- b) Program Counter
- c) Instruction Register
- d) Accumulator

Answer: b) Program Counter

2279. The accumulator in 8085 is used to:

- a) Store addresses
- b) Control program flow
- c) Perform arithmetic/logic operations
- d) Count clock cycles

Answer: c) Perform arithmetic/logic operations

2280. What is the function of the ALE pin in 8085?

- a) Address Latch Enable
- b) Arithmetic Logic Enable
- c) Access Latch Enable
- d) Acknowledge Latch Enable

Answer: a) Address Latch Enable

2281. The 8085 has how many pins?

- a) 20
- b) 30
- c) 40
- d) 50

Answer: c) 40

2282. Which pin is used to reset the microprocessor?

- a) HOLD
- b) RESET IN
- c) S0
- d) READY

Answer: b) RESET IN

2283. Which bus is used to carry data within the 8085?

- a) Address bus
- b) Control bus
- c) Data bus
- d) Instruction bus

Answer:

- c) Data bus

2284. The 8085 microprocessor can address up to how many memory locations?

- a) 8 KB
- b) 32 KB
- c) 64 KB
- d) 128 KB

Answer: c) 64 KB

2285. The control unit in 8085:

- a) Stores instructions
- b) Executes arithmetic operations
- c) Generates timing and control signals
- d) Increments the program counter

Answer: c) Generates timing and control signals

2286. How many flags are present in 8085's flag register?

- a) 3
- b) 5
- c) 6
- d) 8

Answer: b) 5

2287. Which flag is set when the result of an operation is zero in 8085 microprocessor?

- a) Carry flag
- b) Sign flag
- c) Auxiliary carry
- d) Zero flag

Answer: d) Zero flag

2288. The Carry Flag in 8085 microprocessor is affected by:

- a) Logical operations
- b) MOV instruction
- c) Arithmetic operations like ADD
- d) No operations

Answer: c) Arithmetic operations like ADD

2289. What is a T-state in 8085?

- a) Time taken to execute an instruction
- b) One clock period
- c) One machine cycle
- d) One fetch cycle

Answer: b) One clock period

2290. The instruction cycle of 8085 microprocessor consists of:

- a) Only machine cycles
- b) T-states only
- c) Fetch and execution cycles
- d) None of the above

Answer: c) Fetch and execution cycles

2291. In Von Neumann architecture (microprocessor related), which of the following is shared?

- a) Control Unit and ALU
- b) Data and Instruction Buses
- c) Memory for Data and Instructions
- d) Registers and I/O

Answer: c) Memory for Data and Instructions

2292. Harvard architecture (microcontroller related) allows:

- a) Only one operation at a time
- b) Parallel instruction and data access
- c) Mixing of instructions and data
- d) Only one bus

Answer: b) Parallel instruction and data access

2293. Which type of architecture is used in Intel 8085?

- a) Harvard
- b) Modified Harvard
- c) Von Neumann
- d) None of the above

Answer: c) Von Neumann

2294. What is a key disadvantage of Von Neumann architecture?

- a) Expensive memory
- b) Complex programming
- c) Von Neumann bottleneck
- d) Lack of timers

Answer: c) Von Neumann bottleneck

2295. Which architecture is best suited for signal processing and embedded control?

- a) Harvard
- b) Von Neumann
- c) Turing
- d) ARM 7

Answer: a) Harvard

2296. Which of the following is a data transfer instruction in the 8085 microprocessor?

- a) ADD
- b) MOV
- c) JMP
- d) MVI

Answer: d) MVI

2297. Which instruction in 8085 is used to add two numbers stored in registers?

- a) ADD
- b) SUB
- c) ADC
- d) DAA

Answer: a) ADD

2298. Which of the following is an example of an arithmetic instruction?

- a) MOV
- b) CMP
- c) ADD
- d) JMP

Answer: c) ADD

2299. The instruction JC in 8085 is an example of a:

- a) Data transfer instruction
- b) Arithmetic instruction
- c) Branching instruction
- d) Machine control instruction

Answer: c) Branching instruction

2300. Which of the following is a logical instruction in the 8085 microprocessor?

- a) ADD
- b) CMP
- c) ORA
- d) JMP

Answer: c) ORA

2301. In indirect addressing mode, the operand is:

- a) Directly provided in the instruction
- b) Stored in a register
- c) Stored at the memory address specified by a register pair
- d) Stored in the accumulator

Answer: c) Stored at the memory address specified by a register pair

2302. What does the MOV instruction do in 8085 assembly language?

- a) Adds two numbers
- b) Transfers data between registers or memory and register
- c) Jumps to another location
- d) Subtracts two numbers

Answer: b) Transfers data between registers or memory and register

2303. In immediate addressing mode, the operand is:

- a) Stored in memory
- b) A constant value directly in the instruction
- c) In the accumulator
- d) In a register pair

Answer: b) A constant value directly in the instruction

2304. Which of the following addressing modes is used in MOV A, M instruction?

- a) Direct addressing
- b) Register addressing
- c) Register indirect addressing
- d) Immediate addressing

Answer: c) Register indirect addressing

2305. The JMP instruction in 8085 is an example of:

- a) Data transfer instruction
 - b) Arithmetic instruction
 - c) Branching instruction
 - d) Machine control instruction
- Answer: c)
Branching instruction

2306. The instruction SUB in 8085 performs:

- a) Addition of two numbers
- b) Subtraction of the accumulator with memory contents
- c) Logical AND operation
- d) Data transfer between registers

Answer: b) Subtraction of the accumulator with memory contents

2307. In the MVI instruction, the I stands for:

- a) Input
- b) Immediate
- c) Indirect
- d) Instruction

Answer: b) Immediate

2308. Which of the following instructions is used to jump to a memory location?

- a) JMP
- b) MOV
- c) RLC
- d) ADD

Answer: a) JMP

2309. The instruction RLC in 8085 is used for:

- a) Left shift of the accumulator
- b) Right shift of the accumulator
- c) Rotate the contents of the accumulator left
- d) Rotate the contents of the accumulator right

Answer: c) Rotate the contents of the accumulator left

2310. What is the primary use of loops in 8085 assembly language programming?

- a) To execute instructions sequentially
- b) To perform arithmetic operations
- c) To repeat a block of instructions
- d) To perform branching

Answer: c) To repeat a block of instructions

2311. Which of the following instructions is used to initialize a register with an immediate value?

- a) MVI
- b) MOV
- c) ADD
- d) JMP

Answer: a) MVI

2312. Which addressing mode is used in ADD B instruction?

- a) Direct
- b) Immediate
- c) Register
- d) Indirect

Answer: c) Register

2313. Which of the following memory types is non-volatile?

- a) RAM
- b) ROM
- c) EPROM
- d) Both b and c

Answer: d) Both b and c

2314. In which type of memory is data erased by ultraviolet light and then can be reprogrammed?

- a) RAM
- b) ROM
- c) EPROM
- d) EEPROM

Answer: c) EPROM

2315. Which of the following memory types is volatile?

- a) ROM
- b) RAM
- c) EPROM
- d) Both b and c

Answer: b) RAM

2316. Which type of memory is commonly used to store the firmware (permanent programs)?

- a) RAM
- b) ROM
- c) EPROM
- d) DRAM

Answer: b) ROM

2317. Which of the following memory types is readable and writable?

- a) ROM
- b) EPROM
- c) RAM
- d) Flash memory

Answer: c) RAM

2318. When interfacing RAM with the microprocessor, which of the following is typically used to select the memory?

- a) Address bus
- b) Data bus
- c) Control bus
- d) All of the above

Answer: a) Address bus

2319. Which of the following is used to enable the memory chip during memory interfacing?

- a) Chip Select
- b) Address Line
- c) Data Line
- d) Read/Write signal

Answer: a) Chip Select

2320. The memory chip selection in interfacing is generally done using:

- a) Address decoding
- b) Control signals
- c) Direct addressing
- d) Both a and b

Answer: d) Both a and b

2321. In I/O mapped I/O, the I/O devices are accessed using:

- a) Memory addresses
- b) Specific I/O instructions like IN and OUT
- c) Address bus
- d) Both b and c

Answer: b) Specific I/O instructions like IN and OUT

2322. In memory-mapped I/O, the I/O devices are treated as:

- a) Separate from memory
- b) Part of the memory address space
- c) Only accessed by IN/OUT instructions
- d) Not accessible by the processor

Answer: b) Part of the memory address space

2323. Which of the following is an advantage of memory-mapped I/O over I/O-mapped I/O?

- a) Uses separate I/O instructions
- b) Fewer address lines required
- c) Same instructions can be used for both I/O and memory
- d) Faster data transfer

Answer: c) Same instructions can be used for both I/O and memory

2324. In I/O mapped I/O, the I/O devices are assigned addresses in the range:

- a) 0000H to FFFFH
- b) 0000H to 3FFFH
- c) 0000H to 7FFFH
- d) 0000H to FFFFFH

Answer: b) 0000H to 3FFFH

2325. Which of the following is used in memory-mapped I/O to identify whether the read/write operation is on memory or I/O?

- a) I/O instructions
- b) Address decoding
- c) Control signals
- d) Both b and c

Answer: d) Both b and c

2326. Address decoding is used to:

- a) Assign a unique address to each memory location
- b) Determine which device (memory or I/O) the microprocessor is accessing
- c) Direct data flow through the data bus
- d) Set the direction of data transfer

Answer: b) Determine which device (memory or I/O) the microprocessor is accessing

2327. In address decoding, when the address is decoded, it activates:

- a) A chip select signal
- b) An interrupt signal
- c) A read/write signal
- d) A clock signal

Answer: a) A chip select signal

2328. Which of the following techniques is used in address decoding for activating a specific memory or I/O device?

- a) Boolean expressions
- b) Address comparison
- c) Address range allocation
- d) All of the above

Answer: d) All of the above

2329. A common method of address decoding in microprocessor systems is to use:

- a) A comparator circuit
- b) A combination of logic gates
- c) A microcontroller
- d) A counter circuit

Answer: b) A combination of logic gates

2330. Which of the following interrupts is hardware-generated in the 8085 microprocessor?

- a) RST7.5
- b) TRAP
- c) INTR
- d) All of the above

Answer: d) All of the above

2331. Which of the following interrupts is software-generated in the 8085 microprocessor?

- a) TRAP
- b) INTR
- c) RST7.5
- d) None of the above

Answer: d) None of the above

2332. The TRAP interrupt in the 8085 microprocessor is:

- a) Maskable and low-priority
- b) Non-maskable and high-priority
- c) Maskable and high-priority
- d) Non-maskable and low-priority

Answer: b) Non-maskable and high-priority

2333. The INTR (Interrupt Request) signal is a:

- a) Maskable interrupt
- b) Non-maskable interrupt
- c) Fixed priority interrupt
- d) Software interrupt

Answer: a) Maskable interrupt

2334. The 8085 microprocessor has how many interrupt lines?

- a) 3
- b) 5
- c) 6
- d) 8

Answer: b) 5

2335. Which of the following interrupts has the highest priority in the 8085 microprocessor?

- a) INTR
- b) TRAP
- c) RST7.5
- d) RST6.5

Answer: b) TRAP

2336. What is the function of the RST (Restart) instructions in 8085?

- a) They act as software interrupts
- b) They initiate a jump to a specific memory address
- c) They are used for hardware communication
- d) Both a and b

Answer: d) Both a and b

2337. The interrupt vector table stores:

- a) Interrupt service routine addresses
- b) Interrupt status
- c) Masking instructions
- d) Interrupt acknowledgment signals

Answer: a) Interrupt service routine addresses

2338. The interrupt vector table for RST7.5, RST6.5, and RST5.5 in the 8085 starts from memory address:

- a) 0024H
- b) 0040H
- c) 002C
- d) 003C

Answer: a) 0024H

2339. In the 8085, the TRAP interrupt has an associated vector address of:

- a) 0034H
- b) 0024H
- c) 0044H
- d) 0064H

Answer: a) 0034H

2340. In the timing diagram of the 8085, which signal is used to indicate that the microprocessor is reading data from memory?

- a) RD
- b) WR
- c) M/IO
- d) ALE

Answer: a) RD

2341. Which of the following signals is used to synchronize the data transfer between the microprocessor and memory in the 8085?

- a) ALE
- b) RD
- c) WR
- d) CLK

Answer: a) ALE

2342. In the timing diagram of 8085, the ALE signal indicates:

- a) The presence of data on the data bus
- b) The address is available on the address bus
- c) A read operation
- d) A write operation

Answer: b) The address is available on the address bus

2343. The M/IO signal in the 8085 indicates:

- a) Whether the operation is a memory or I/O operation
- b) Whether the data is being read or written
- c) The timing for the memory read
- d) The direction of data transfer

Answer: a) Whether the operation is a memory or I/O operation

2344. In the timing diagram for 8085, the WR signal is used to:

- a) Indicate a memory write operation
- b) Indicate a memory read operation
- c) Indicate an I/O read operation
- d) Indicate an I/O write operation

Answer: a) Indicate a memory write operation

2345. The 8255 is used for interfacing:

- a) Memory
- b) Keyboard
- c) I/O devices
- d) Display

Answer: c) I/O devices

2346. The 8255 has how many I/O ports?

- a) 2
- b) 4
- c) 8
- d) 16

Answer: b) 4

2347. In 8255, each I/O port can be configured as:

- a) Input or Output
- b) Only Output
- c) Only Input
- d) Both A and B

Answer: a) Input or Output

2348. The 8255 microprocessor peripheral interface is used to provide communication between:

- a) Microprocessor and keyboard
- b) Microprocessor and display
- c) Microprocessor and external I/O devices
- d) Microprocessor and memory

Answer: c) Microprocessor and external I/O devices

2349. In 8255, the Control Word is used to:

- a) Enable data transfer
- b) Select mode of operation for each port
- c) Select the interrupt source
- d) All of the above

Answer: b) Select mode of operation for each port

2350. The 8253 is a programmable timer used for:

- a) Interrupt generation
- b) Clock generation
- c) Frequency division
- d) All of the above

Answer: d) All of the above

2351. The 8253 timer has how many counters?

- a) 1
- b) 2
- c) 3
- d) 4

Answer: c) 3

2352. In the 8253, the mode of operation is selected by:

- a) Control word
- b) Data bus
- c) Interrupt vector
- d) Clock signal

Answer: a) Control word

2353. Which of the following is NOT a mode of operation in the 8253?

- a) Mode 0 - Interrupt on terminal count
- b) Mode 1 - Programmable square wave generator
- c) Mode 2 - Rate generator
- d) Mode 3 - Pulse width modulation

Answer: d) Mode 3 - Pulse width modulation (This is an invalid mode for the 8253)

2354. The 8279 is used for interfacing:

- a) Keyboard and display
- b) Printer
- c) I/O devices
- d) Memory

Answer: a) Keyboard and display

II. BASIC PRINCIPLES AND FUNCTIONS OF THE FOLLOWING

a) PLC's

2355. What does the acronym PLC stand for?

- A) Programmable Logic Controller
- B) Programmable Linear Controller
- C) Private Logic Controller
- D) Programmed Logic Control

Answer: A) Programmable Logic Controller

2356. Which of the following is the main purpose of a PLC?

- A) To automate industrial processes
- B) To store data
- C) To measure physical parameters
- D) To monitor system performance

Answer: A) To automate industrial processes

2357. What type of devices are typically controlled by PLCs?

- A) Personal computers
- B) Motor drives, conveyor belts, and valves
- C) Phones and televisions
- D) Data centers

Answer: B) Motor drives, conveyor belts, and valves

2358. Which programming language is most commonly used in PLC systems?

A) Ladder Logic

B) C++

C) Python

D) Java

Answer: A) Ladder Logic

2359. What is the purpose of the input section in a PLC?

A) To process the data

B) To execute the control program

C) To read signals from sensors or switches

D) To control the actuators

Answer: C) To read signals from sensors or switches

2360. What is a PLC output used for?

A) To perform calculations

B) To communicate with a computer

C) To provide control signals to external devices (e.g., motors, valves)

D) To monitor the PLC's status

Answer: C) To provide control signals to external devices (e.g., motors, valves)

2361. Which of the following is a common feature of PLCs?

A) Ability to perform basic arithmetic operations

B) Control of digital devices only

C) Limited input and output options

D) Only used in small, manual systems

Answer: A) Ability to perform basic arithmetic operations

2362. What is the role of the CPU in a PLC system?

- A) To read input signals
- B) To execute the control program and process inputs/outputs
- C) To store historical data
- D) To provide communication with other devices

Answer: B) To execute the control program and process inputs/outputs

2363. Which of the following is NOT a common type of input in PLCs?

- A) Discrete inputs (digital)
- B) Analog inputs
- C) Discrete outputs
- D) Memory modules

Answer: D) Memory modules

2364. How does a PLC system typically receive input signals from sensors or switches?

- A) Through an external computer
- B) Via input modules that convert physical signals into digital values
- C) By using wireless communication only
- D) Through a built-in HMI

Answer: B) Via input modules that convert physical signals into digital values

2365. What is the function of an "output module" in a PLC?

- A) To execute logic operations
- B) To convert output signals from digital form to physical actions (e.g., motor on/off)
- C) To store historical data
- D) To process analog data

Answer: B) To convert output signals from digital form to physical actions (e.g., motor on/off)

2366. Which type of PLC input is most commonly used to measure temperature?

- A) Discrete input
- B) Analog input
- C) Digital input
- D) Serial input

Answer: B) Analog input

2367. Which of the following is a key advantage of using PLCs in industrial automation?

- A) High cost of installation
- B) Flexibility in control of complex processes
- C) Limited expandability
- D) Lack of programming languages

Answer: B) Flexibility in control of complex processes

2368. What is the most common type of output in a PLC system?

- A) Analog output
- B) Relay output
- C) Digital output
- D) Pneumatic output

Answer: C) Digital output

2369. What is an example of a discrete (digital) input in a PLC system?

- A) Temperature sensor
- B) On/Off switch
- C) Pressure gauge
- D) Flow meter

Answer: B) On/Off switch

2370. Which of the following is NOT typically a part of a PLC's hardware?

- A) CPU
- B) Power supply
- C) HMI (Human Machine Interface)
- D) Keyboard

Answer: D) Keyboard

2371. What does the "scan cycle" of a PLC refer to?

- A) The time taken to process a single input signal
- B) The time it takes to read inputs, execute the program, and update outputs
- C) The frequency of control outputs
- D) The rate at which the PLC can communicate with external devices

Answer: B) The time it takes to read inputs, execute the program, and update outputs

2372. What is the most common PLC programming language that mimics electrical relay logic?

- A) Ladder Logic
- B) Structured Text
- C) Function Block Diagram
- D) Sequential Function Chart

Answer: A) Ladder Logic

2373. What is an advantage of using a "modular" PLC design?

- A) Increased processing speed
- B) Simplified programming
- C) Flexibility to add or remove I/O modules as needed
- D) Reduced need for external communication

Answer: C) Flexibility to add or remove I/O modules as needed

2374. Which of the following is a primary use case for a PLC system?

- A) Powering electrical devices directly
- B) Automating manufacturing lines and processes
- C) Running software applications
- D) Storing database information

Answer: B) Automating manufacturing lines and processes

2375. Which part of the PLC is responsible for executing the user's program?

- A) Power supply
- B) CPU (Central Processing Unit)
- C) Input module
- D) Output module

Answer: B) CPU (Central Processing Unit)

2376. What type of signal does a discrete output module in a PLC typically send?

- A) Analog signal
- B) Digital signal (On/Off)
- C) Serial signal
- D) Temperature signal

Answer: B) Digital signal (On/Off)

2377. What does the term "sinking input" refer to in a PLC?

- A) A type of input that requires power to be applied to the device
- B) An input where the controller provides power to the field device
- C) An input signal that is at ground or low voltage when active
- D) An input signal that needs to be processed by the CPU

Answer: C) An input signal that is at ground or low voltage when active

2378. What is a "retentive" memory in a PLC?

- A) A memory that retains its value even when the power is lost
- B) A memory used for calculations
- C) A memory that resets to zero after every scan cycle
- D) A memory used for storing programs

Answer: A) A memory that retains its value even when the power is lost

2379. Which of the following is typically the most common type of PLC communication method?

- A) Wi-Fi
- B) Serial communication (RS-232, RS-485)
- C) Bluetooth
- D) Infrared communication

Answer: B) Serial communication (RS-232, RS-485)

2380. In a PLC, what does "latching" refer to?

- A) Holding a relay in an activated state even after the input signal is no longer present
- B) Changing the output state based on input changes only
- C) Storing a specific data value in a memory register
- D) Resetting all outputs to their initial states

Answer: A) Holding a relay in an activated state even after the input signal is no longer present

2381. What does the term "PLC ladder diagram" refer to?

- A) A graphical representation of a PLC's memory structure
- B) A programming method based on relay contacts and coils arranged in a ladder-like structure
- C) A report for debugging PLC programs
- D) A physical device for connecting PLCs to sensors

Answer: B) A programming method based on relay contacts and coils arranged in a ladder-like structure

2382. What is the function of a PLC "diagnostic" indicator?

- A) To store the user program
- B) To provide real-time data on the controller's performance and issues
- C) To process input data
- D) To execute the control program

Answer: B) To provide real-time data on the controller's performance and issues

2383. In a PLC, what type of data can be stored in a "register"?

- A) Programs only
- B) Input and output signals
- C) Process control data such as integer or floating-point values
- D) Communications configurations

Answer: C) Process control data such as integer or floating-point values

2384. What is the primary benefit of using PLCs in automation over traditional hard-wired control systems?

- A) Increased energy consumption
- B) Easier program modification and flexibility
- C) More complex wiring
- D) Lack of maintenance

Answer: B) Easier program modification and flexibility

2385. What does the term "scan time" in a PLC refer to?

- A) The time it takes to read inputs and outputs
- B) The time it takes for the PLC to execute the user's program once
- C) The time it takes to power up the PLC
- D) The time it takes to reset the PLC

Answer: B) The time it takes for the PLC to execute the user's program once

2386. In a PLC, what happens during the "input scan" phase?

- A) The CPU processes the program logic
- B) The PLC reads the status of all input devices
- C) The outputs are updated
- D) The communication with external devices is initialized

Answer: B) The PLC reads the status of all input devices

2387. Which of the following PLC components determines the behavior of the PLC system?

- A) Input module
- B) CPU
- C) Power supply
- D) Output module

Answer: B) CPU

2388. What type of PLC system is most commonly used in large-scale industries such as automobile manufacturing?

- A) Micro PLC
- B) Modular PLC
- C) Rack-mounted PLC
- D) Compact PLC

Answer: B) Modular PLC

2389. What does "I/O" stand for in a PLC system?

- A) Input/output
- B) Input-only
- C) Immediate/Output
- D) Input/Output controller

Answer: A) Input/output

2390. Which of the following programming languages is typically used for more complex PLC applications?

- A) Ladder Logic
- B) Function Block Diagram
- C) Structured Text
- D) Sequential Function Chart

Answer: C) Structured Text

2391. What is the primary function of the PLC "power supply"?

- A) To execute the user program
- B) To provide power to the CPU and I/O modules
- C) To store input signals
- D) To communicate with the external network

Answer: B) To provide power to the CPU and I/O modules

2392. What kind of output device can a PLC typically control?

- A) Air compressors
- B) Digital displays
- C) Relays, solenoids, and motors
- D) Sensors and pressure gauges

Answer: C) Relays, solenoids, and motors

2393. Which of the following is a feature of a "micro PLC"?

- A) It has many I/O modules
- B) It is typically used for small, simple applications
- C) It is only suitable for large-scale industrial operations
- D) It requires external power sources to operate

Answer: B) It is typically used for small, simple applications

2394. In PLC programming, what does the "coil" represent?

- A) A physical device like a motor
- B) A data structure used to store variables
- C) A binary output that can be turned ON or OFF
- D) A feedback mechanism

Answer: C) A binary output that can be turned ON or OFF

2395. Which of the following programming languages for PLC is most similar to high-level programming languages?

- A) Ladder Logic
- B) Structured Text
- C) Function Block Diagram
- D) Sequential Function Chart

Answer: B) Structured Text

2396. What is the primary difference between a "compact PLC" and a "modular PLC"?

- A) Compact PLCs have limited expansion capabilities
- B) Modular PLCs require more space
- C) Compact PLCs are only for small applications
- D) Modular PLCs do not have I/O capabilities

Answer: A) Compact PLCs have limited expansion capabilities

2397. In PLCs, what is the purpose of the "timer" function?

- A) To delay or create time-based events in control logic
- B) To store control programs
- C) To monitor input data
- D) To control analog signals

Answer: A) To delay or create time-based events in control logic

2398. What is the maximum number of I/O devices a PLC can handle based on its design?

- A) It depends on the PLC's memory and module slots
- B) Always 64 devices
- C) Always 128 devices
- D) It is fixed at 256 devices

Answer: A) It depends on the PLC's memory and module slots

2399. Which of the following represents a disadvantage of using PLC systems in automation?

- A) High cost
- B) Limited functionality compared to other systems
- C) Difficulty in integration with existing machinery
- D) Inability to handle multiple control loops

Answer: A) High cost

2400. What is a "PID controller" used for in a PLC system?

- A) To control complex sequential processes
- B) To manage proportional, integral, and derivative control loops for continuous processes
- C) To store input data
- D) To automate ladder diagrams

Answer: B) To manage proportional, integral, and derivative control loops for continuous processes

2401. Which of the following is an advantage of using PLCs in industrial environments?

- A) High energy consumption
- B) High flexibility and reconfigurability
- C) Frequent failure rates
- D) Difficulty in installation

Answer: B) High flexibility and reconfigurability

2402. What type of memory is typically used in a PLC for storing the program logic?

- A) Flash memory
- B) Random Access Memory (RAM)
- C) Read-Only Memory (ROM)
- D) EEPROM

Answer: C) Read-Only Memory (ROM)

2403. Which of the following is a characteristic of a "distributed I/O" system in a PLC?

- A) All I/O modules are installed within the PLC itself
- B) I/O modules are placed remotely from the PLC and connected via communication lines
- C) It has a centralized I/O system
- D) It does not support analog inputs

Answer: B) I/O modules are placed remotely from the PLC and connected via communication lines

2404. What is an example of a "non-volatile" memory in a PLC?

- A) RAM
- B) ROM
- C) Cache memory
- D) Registers

Answer: B) ROM

2405. Which of the following is a type of "analog" input used in PLC systems?

- A) Proximity sensor
- B) Temperature sensor
- C) Push button switch
- D) Light sensor

Answer: B) Temperature sensor

2406. What is the main benefit of using a PLC over hard-wired relay systems?

- A) Faster processing
- B) Simplicity in control
- C) More expensive
- D) More complex wiring

Answer: A) Faster processing

2407. What type of signal does an "analog input" in a PLC typically handle?

- A) Digital On/Off signals
- B) Pulse signals
- C) Continuous variable signals
- D) Binary signals

Answer: C) Continuous variable signals

2408. What is the main function of a "counter" in a PLC program?

- A) To measure time intervals
- B) To store the control program
- C) To count occurrences of an event
- D) To control analog signals

Answer: C) To count occurrences of an event

2409. What is an example of a "discrete output" in a PLC system?

- A) Speed controller
- B) Temperature regulator
- C) Relay or solenoid
- D) Flow rate monitor

Answer: C) Relay or solenoid

2410. Which of the following components is NOT part of a PLC system?

- A) Input devices
- B) Output devices
- C) Data processing unit
- D) Heat exchanger

Answer: D) Heat exchanger

2411. What is a typical use case for a "micro PLC"?

- A) Large-scale industrial automation
- B) High-speed data processing
- C) Small automation applications with limited I/O
- D) Control of heavy machinery

Answer: C) Small automation applications with limited I/O

2412. Which programming language for PLCs is similar to flowchart logic and often used for process control?

- A) Ladder Logic
- B) Structured Text
- C) Function Block Diagram
- D) Sequential Function Chart

Answer: C) Function Block Diagram

2413. What does a "relay" output typically control in a PLC system?

- A) A single discrete output device like a motor or light
- B) An analog device such as a temperature sensor
- C) Digital I/O conversion
- D) Program execution flow

Answer: A) A single discrete output device like a motor or light

2414. What is the purpose of a "watchdog timer" in a PLC system?

- A) To prevent the PLC from overheating
- B) To ensure the PLC program is operating correctly by resetting the PLC if it hangs
- C) To track execution time of each program cycle
- D) To monitor the CPU's health

Answer: B) To ensure the PLC program is operating correctly by resetting the PLC if it hangs

2415. Which of the following PLC components communicates directly with the field devices?

- A) CPU
- B) Input/Output modules
- C) Power supply
- D) HMI

Answer: B) Input/Output modules

2416. What is a common method for connecting remote PLC I/O modules to a central controller?

- A) Wi-Fi
- B) Serial communication (RS-232, RS-485)
- C) Infrared
- D) Parallel communication

Answer: B) Serial communication (RS-232, RS-485)

2417. Which of the following types of memory is volatile in a PLC system?

- A) EEPROM
- B) Flash
- C) RAM
- D) ROM

Answer: C) RAM

2418. What does the term "sourcing input" refer to in PLC systems?

- A) A type of input where power is supplied to the field device from the PLC
- B) A type of input where the PLC provides ground
- C) An output signal that is sent to the field device
- D) An input that communicates with remote PLCs

Answer: A) A type of input where power is supplied to the field device from the PLC

2419. What is the function of the "shift register" instruction in PLC programming?

- A) To store values for processing
- B) To shift data values through a series of memory locations
- C) To monitor analog inputs
- D) To set up timers

Answer: B) To shift data values through a series of memory locations

2420. What is the most common type of relay used as a PLC output?

- A) Solid-state relay
- B) Mechanical relay
- C) Fiber optic relay
- D) Pneumatic relay

Answer: B) Mechanical relay

2421. Which of the following is a characteristic of "ladder logic" programming?

- A) It is based on mathematical equations
- B) It uses graphical symbols to represent logic operations
- C) It is used for controlling analog systems only
- D) It uses a text-based coding structure

Answer: B) It uses graphical symbols to represent logic operations

2422. What is the purpose of using "tags" in PLC programming?

- A) To track system performance
- B) To assign names to variables and memory locations for easier reference
- C) To configure I/O modules
- D) To reset PLC memory

Answer: B) To assign names to variables and memory locations for easier reference

2423. Which of the following best describes the role of an "HMI" (Human-Machine Interface) in a PLC system?

- A) To execute the PLC program
- B) To allow operators to interact with the control system and monitor process variables
- C) To provide power to the PLC
- D) To store data from the field devices

Answer: B) To allow operators to interact with the control system and monitor process variables

2424. Which of the following is the main advantage of using a "modular PLC"?

- A) Low initial cost
- B) Fixed number of I/O channels
- C) High scalability and flexibility in configuration
- D) Simplicity of programming

Answer: C) High scalability and flexibility in configuration

2425. What is the function of a "digital input" in a PLC?

- A) To measure continuous physical quantities
- B) To convert analog signals to digital
- C) To provide a signal indicating the presence or absence of a condition
- D) To perform calculations

Answer: C) To provide a signal indicating the presence or absence of a condition

2426. Which of the following is the typical voltage range for a PLC input signal?

- A) 1-5 V DC
- B) 0-24 V DC
- C) 12-48 V AC
- D) 220-240 V AC

Answer: B) 0-24 V DC

2427. What type of sensor is commonly used with PLCs to detect position or movement?

- A) Temperature sensor
- B) Proximity sensor
- C) Light sensor
- D) Pressure sensor

Answer: B) Proximity sensor

2428. In PLC systems, what is an "I/O module" used for?

- A) To execute the control program
- B) To provide interfaces for external devices like sensors and actuators
- C) To store the user program
- D) To power the PLC system

Answer: B) To provide interfaces for external devices like sensors and actuators

2429. What does the term "control relay" refer to in PLC programming?

- A) A relay used to perform time-based operations
- B) A relay that stores the status of the system
- C) A relay that activates or deactivates output devices based on input conditions
- D) A relay used to monitor PLC memory

Answer: C) A relay that activates or deactivates output devices based on input conditions

2430. Which of the following represents an advantage of using a "distributed I/O system" in a PLC?

- A) It simplifies wiring by centralizing all I/O modules
- B) It allows for long-distance communication between remote I/O modules and the controller
- C) It makes troubleshooting easier by reducing the number of I/O modules
- D) It reduces the complexity of the control program

Answer: B) It allows for long-distance communication between remote I/O modules and the controller

2431. What is the role of "process control" in PLC systems?

- A) To control the speed of the processor
- B) To adjust and maintain process variables such as temperature, pressure, and flow
- C) To generate outputs for display purposes
- D) To log system data for future analysis

Answer: B) To adjust and maintain process variables such as temperature, pressure, and flow

2432. Which PLC programming language is best suited for continuous control of complex processes?

- A) Ladder Logic
- B) Structured Text
- C) Function Block Diagram
- D) Sequential Function Chart

Answer: C) Function Block Diagram

2433. In which of the following applications would a "PID controller" be commonly used within a PLC?

- A) Control of motor start/stop functions
- B) Temperature regulation in a furnace or oven
- C) Counting items on a production line

D) Monitoring input voltage levels

Answer: B) Temperature regulation in a furnace or oven

2434. What is a "data block" in PLC programming?

A) A set of program instructions for controlling a process

B) A section of memory used to store related data values

C) A type of input/output signal

D) A hardware component used to interface with external devices

Answer: B) A section of memory used to store related data values

2435. What does the "process image" in a PLC refer to?

A) A diagram showing the layout of the PLC

B) The stored representation of the current input and output states

C) The graphical representation of the control program

D) A log of recent errors and faults

Answer: B) The stored representation of the current input and output states

2436. What does the term "scanning" refer to in a PLC system?

A) The process of checking for input errors

B) The execution of the control program in a cycle, reading inputs and updating outputs

C) The reading of outputs in real-time

D) The frequency of communication with external devices

Answer: B) The execution of the control program in a cycle, reading inputs and updating outputs

2437. Which of the following is a key feature of a "smart" I/O module in a PLC system?

A) It can process and execute control logic without involving the CPU

B) It can store user programs

C) It requires no external power supply

D) It automatically adjusts the PLC's scan cycle

Answer: A) It can process and execute control logic without involving the CPU

2438. In PLC programming, what does the "OR" operation do?

A) It checks if both inputs are false

B) It checks if at least one input is true

C) It inverts the input signals

D) It sets the output to true when all inputs are true

Answer: B) It checks if at least one input is true

2439. Which of the following is a common use of "HMI" (Human-Machine Interface) in PLC systems?

A) Writing the control program

B) Displaying information such as system status and alarms to operators

C) Monitoring the PLC's power supply

D) Controlling I/O modules

Answer: B) Displaying information such as system status and alarms to operators

2440. What is the primary role of a "load cell" in PLC systems?

A) To monitor pressure in pipes

B) To detect the presence of an object

C) To measure force or weight

D) To measure temperature

Answer: C) To measure force or weight

2441. Which of the following describes the function of a "status bit" in a PLC?

A) It stores the input data

B) It indicates the current state of the PLC's outputs

C) It is used to track the status of a process or variable within the program

D) It is used to communicate with external devices

Answer: C) It is used to track the status of a process or variable within the program

2442. What does "PLC redundancy" refer to?

A) Using multiple PLCs in a parallel configuration to ensure system reliability

B) The ability to store data redundantly for backup purposes

C) The use of backup power supplies for the PLC

D) The ability to operate without human intervention

Answer: A) Using multiple PLCs in a parallel configuration to ensure system reliability

2443. What is the main advantage of "solid-state relays" over traditional mechanical relays in PLC systems?

A) Faster switching times and no moving parts

B) Lower cost

C) Higher power output

D) Easier to program

Answer: A) Faster switching times and no moving parts

2444. In which scenario would "Ethernet/IP" be commonly used in a PLC system?

A) To store program data

B) To enable communication between multiple PLCs and other networked devices

C) To control input signals from sensors

D) To operate the I/O modules directly

Answer: B) To enable communication between multiple PLCs and other networked devices

2445. Which of the following is the primary function of a "remote I/O" module in a PLC system?

A) To execute control logic

B) To provide user input

C) To expand the PLC's I/O capabilities by placing I/O devices far from the controller

D) To store PLC programs

Answer: C) To expand the PLC's I/O capabilities by placing I/O devices far from the controller

2446. What is the main advantage of using a "redundant power supply" in PLC systems?

A) It reduces the need for programming

B) It ensures continuous operation in case of a failure in the primary power supply

C) It increases the speed of the PLC

D) It enhances I/O performance

Answer: B) It ensures continuous operation in case of a failure in the primary power supply

2447. In PLC systems, which of the following is typically used to convert analog signals to digital signals?

A) Analog-to-digital converter (ADC)

B) Digital-to-analog converter (DAC)

C) Voltage regulator

D) Signal amplifier

Answer: A) Analog-to-digital converter (ADC)

2448. What does a "data logger" do in a PLC system?

A) It stores control programs

B) It monitors real-time inputs and stores them for analysis later

C) It stores the PLC's configuration data

D) It generates output signals based on input conditions

Answer: B) It monitors real-time inputs and stores them for analysis later

2449. What is the purpose of a "pre-signal" in PLC systems?

A) To process data before an event occurs

B) To provide a signal to the operator

C) To trigger an output signal before the input condition is met

D) To enable the PLC to communicate with external devices

Answer: C) To trigger an output signal before the input condition is met

2450. What does the "JUMP" instruction do in a PLC program?

A) It executes a block of instructions in parallel

B) It skips over a specified block of code

C) It repeats a set of instructions

D) It transfers data between memory locations

Answer: B) It skips over a specified block of code

2451. What is the purpose of the "FIFO" instruction in a PLC?

A) To store input data

B) To control the execution sequence of the program

C) To manage and process data in the order it was received (First In, First Out)

D) To monitor the health of the PLC

Answer: C) To manage and process data in the order it was received (First In, First Out)

2452. Which of the following best describes a "sequencer" in PLC programming?

A) A programming construct that defines the order of operations or steps in a process

B) A type of digital sensor used for counting

C) A method to manage multiple timers simultaneously

D) A method to read analog signals

Answer: A) A programming construct that defines the order of operations or steps in a process

2453. In PLC systems, what does the term "hot standby" refer to?

A) A backup system that takes over immediately if the primary system fails

B) A maintenance process that powers down the PLC for upgrades

C) The process of checking the status of external devices

D) A system that automatically resets itself after a fault

Answer: A) A backup system that takes over immediately if the primary system fails

2454. Which of the following is NOT typically an output device in a PLC system?

A) Relay

B) Solenoid

C) Sensor

D) Motor

Answer: C) Sensor

2455. What is a "jump to subroutine" instruction used for in a PLC program?

A) To repeat the same set of instructions multiple times

B) To execute a predefined block of code and then return to the main program

C) To initiate external communication

D) To monitor real-time data from sensors

Answer: B) To execute a predefined block of code and then return to the main program

2456. What does the "MCR" (Master Control Reset) instruction do in PLC programming?

A) It resets the entire PLC system

B) It disables the program execution until a reset condition is met

C) It stops the execution of certain logic or operations within the program

D) It enables debugging mode for the PLC

Answer: C) It stops the execution of certain logic or operations within the program

2457. What type of input module is used to interface with a temperature sensor in a PLC?

A) Analog input module

B) Digital input module

C) Relay module

D) Serial communication module

Answer: A) Analog input module

2458. Which of the following is an example of an application for a PLC system with "remote I/O"?

A) An industrial robot arm for assembling parts

B) A traffic light control system located far from the PLC controller

C) A motor control circuit within a small machine

D) A conveyor belt that operates entirely within one factory area

Answer: B) A traffic light control system located far from the PLC controller

2459. Which of the following is a disadvantage of using a "micro PLC"?

A) It lacks sufficient memory to handle large programs

B) It is not compatible with digital devices

C) It does not support expansion modules

D) It has slower processing speeds than large PLCs

Answer: A) It lacks sufficient memory to handle large programs

2460. What is the main reason for using "interrupts" in a PLC system?

A) To speed up the execution of the control program

B) To respond immediately to time-critical events while the program is running

C) To reset the system after an error

D) To execute tasks sequentially

Answer: B) To respond immediately to time-critical events while the program is running

2461. Which of the following PLC programming languages is typically used for continuous process control systems?

A) Ladder Logic

B) Structured Text

C) Function Block Diagram

D) Sequential Function Chart

Answer: C) Function Block Diagram

2462. What does the "XIC" instruction represent in ladder logic programming?

A) A contact that is energized when the input is true

B) A contact that is energized when the input is false

C) A timer function

D) A relay function

Answer: A) A contact that is energized when the input is true

2463. What is the primary advantage of using a "modular PLC" over a "compact PLC"?

A) Greater ability to expand I/O capabilities

B) Faster scan time

C) Lower cost

D) Simpler programming

Answer: A) Greater ability to expand I/O capabilities

2464. What is the purpose of the "shift register" instruction in a PLC system?

A) To store data values in a memory array

B) To convert analog signals to digital

C) To control the flow of electricity through the system

D) To shift data through a series of memory locations in a sequence

Answer: D) To shift data through a series of memory locations in a sequence

2465. Which of the following is an example of a "pulse output" in a PLC system?

A) A relay that turns on and off

B) A signal that is sent for a short duration, often used to control motors

C) A continuous output signal used to control a variable valve

D) An output that provides a constant current signal

Answer: B) A signal that is sent for a short duration, often used to control motors

2466. Which of the following is NOT a function of a PLC's CPU?

A) Executing the control program

B) Storing the system's configuration

C) Monitoring input and output devices

D) Powering the system

Answer: D) Powering the system

2467. What is the purpose of an "analog output" in a PLC system?

A) To send discrete ON/OFF signals to external devices

B) To provide a continuous signal that varies in magnitude

C) To execute control logic

D) To monitor PLC memory

Answer: B) To provide a continuous signal that varies in magnitude

2468. In PLC programming, what is the purpose of the "TON" (Timer On Delay) instruction?

A) To delay the execution of a program section for a set time

B) To count the number of events in a system

C) To trigger an output immediately when an input is received

D) To monitor the status of an analog sensor

Answer: A) To delay the execution of a program section for a set time

2469. Which of the following describes a "digital output" in a PLC system?

A) A signal that continuously varies in magnitude

B) A signal that can be either on or off (binary signal)

C) A signal used for communication between PLCs

D) A signal that operates in real-time with analog inputs

Answer: B) A signal that can be either on or off (binary signal)

2470. Which of the following is the primary use of "industrial Ethernet" in a PLC system?

A) To increase processing speed

B) To facilitate communication between PLCs and other devices in a network

C) To store control programs

D) To measure physical parameters like temperature

Answer: B) To facilitate communication between PLCs and other devices in a network

2471. What does the term "scan cycle" in a PLC system refer to?

A) The time it takes to read and process input signals

B) The time it takes to read inputs, execute the program, and update outputs

C) The frequency at which the PLC performs system diagnostics

D) The amount of time the PLC takes to store program data

Answer: B) The time it takes to read inputs, execute the program, and update outputs

2472. Which programming language for PLCs is most similar to high-level programming languages such as C or Pascal?

A) Ladder Logic

B) Function Block Diagram

C) Structured Text

D) Sequential Function Chart

Answer: C) Structured Text

2473. Which of the following components is part of the PLC's power supply?

A) Input/output modules

B) CPU

C) Relay outputs

D) Voltage converter

Answer: D) Voltage converter

2474. In PLC programming, what is the purpose of the "TON" and "TOF" instructions?

A) To create a time-based delay

B) To manage program loops

C) To monitor input devices

D) To perform logical operations

Answer: A) To create a time-based delay

2475. Which type of PLC memory is used for storing the user's program permanently?

A) ROM

B) RAM

C) EEPROM

D) Flash memory

Answer: C) EEPROM

2476. In a PLC system, what does the "CTU" instruction stand for?

A) Counter Up

B) Counter Timer Unit

C) Clear Timer Unit

D) Counter Down

Answer: A) Counter Up

2477. What is a primary benefit of using "structured text" as a PLC programming language?

A) It is best suited for sequential processes

B) It can handle complex calculations and logic with ease

C) It is visually easy to understand

D) It supports graphical control elements

Answer: B) It can handle complex calculations and logic with ease

2478. What type of communication is commonly used between a PLC and a Human-Machine Interface (HMI)?

A) Ethernet

B) RS-232

C) RS-485

D) All of the above

Answer: D) All of the above

2479. What is an example of a "field device" in a PLC system?

A) PLC CPU

B) I/O module

C) Sensor or actuator

D) Power supply

Answer: C) Sensor or actuator

2480. What does the "MOV" instruction do in PLC programming?

A) It moves a value from one location to another in memory

B) It monitors real-time system status

C) It resets a counter or timer

D) It performs logical comparison between two values

Answer: A) It moves a value from one location to another in memory

2481. In a PLC system, what does the term "output addressing" refer to?

A) The process of programming outputs

B) The method of connecting output devices to the PLC

C) The use of memory addresses to identify output devices

D) The configuration of input/output communication channels

Answer: C) The use of memory addresses to identify output devices

2482. What is the main difference between a "static" and "dynamic" I/O system in a PLC?

A) A static I/O system requires no configuration, while a dynamic I/O system is configurable

B) A static I/O system is fixed, while a dynamic I/O system can be adjusted during operation

C) A static I/O system uses analog signals, while a dynamic system uses digital signals

D) A static I/O system is used only in small PLCs

Answer: B) A static I/O system is fixed, while a dynamic I/O system can be adjusted during operation

2483. Which of the following types of devices is most commonly controlled using a PLC?

A) Robots

B) HVAC systems

C) Conveyor belts

D) All of the above

Answer: D) All of the above

2484. Which of the following PLC programming languages is used for representing control systems using graphic blocks?

A) Ladder Logic

B) Function Block Diagram

C) Structured Text

D) Instruction List

Answer: B) Function Block Diagram

2485. What is the primary purpose of using "PID control" in a PLC system?

A) To handle simple ON/OFF control

B) To adjust and maintain continuous process variables such as temperature, pressure, and flow

C) To detect faults in the system

D) To store input data for analysis

Answer: B) To adjust and maintain continuous process variables such as temperature, pressure, and flow

2486. Which of the following best describes the function of a "control relay" in a PLC system?

A) It amplifies the control signals

B) It holds the system status

C) It acts as an intermediary to activate or deactivate devices based on input conditions

D) It stores the control program

Answer: C) It acts as an intermediary to activate or deactivate devices based on input conditions

2487. What is the purpose of the "RTO" (Retentive Timer On Delay) instruction in PLC programming?

A) To retain the timer value even if the power is lost

B) To create a time delay before an event occurs

C) To reset a timer

D) To monitor analog sensors

Answer: A) To retain the timer value even if the power is lost

2488. In which scenario would "analog input" be used in a PLC system?

A) To measure temperature, pressure, or flow

B) To detect the presence of a part on a conveyor

C) To turn a motor on or off

D) To count the number of items passing through a sensor

Answer: A) To measure temperature, pressure, or flow

2489. What does the "MOV" instruction do in ladder logic?

A) It moves data from one memory location to another

B) It performs a mathematical operation on data

C) It checks if a condition is true or false

D) It resets the output

Answer: A) It moves data from one memory location to another

2490. What is the main purpose of using a "communication module" in a PLC system?

A) To process the control logic

B) To communicate with other PLCs or external devices

C) To store data in memory

D) To interface with analog sensors

Answer: B) To communicate with other PLCs or external devices

2491. In PLC systems, what does "scan time" refer to?

A) The time it takes to execute the user program once

B) The time it takes for an input signal to reach the CPU

C) The time it takes to download the program from the computer to the PLC

D) The time it takes to calibrate sensors

Answer: A) The time it takes to execute the user program once

2492. Which of the following PLC programming languages uses graphical symbols to represent control devices and connections?

A) Ladder Logic

B) Structured Text

C) Sequential Function Chart

D) Function Block Diagram

Answer: A) Ladder Logic

2493. In PLC programming, what does the "NOP" instruction do?

A) It performs a mathematical operation

B) It forces an output to a certain state

C) It does nothing, acting as a placeholder

D) It resets the system

Answer: C) It does nothing, acting as a placeholder

2494. What is the key benefit of using a "distributed control system" (DCS) instead of a centralized PLC system?

A) Simplified programming

B) Reduced wiring and communication costs

C) Better process control in distributed and large-scale systems

D) Easier maintenance and repair

Answer: C) Better process control in distributed and large-scale systems

2495. What does the "CNT" instruction in PLC programming do?

A) It counts up or down based on input signals

B) It stores a counter value

C) It compares input signals

D) It controls the program flow

Answer: A) It counts up or down based on input signals

2496. Which of the following is an example of a "discrete" input device for a PLC?

A) Thermocouple

B) Pressure sensor

C) Push button

D) Flowmeter

Answer: C) Push button

2497. Which communication protocol is commonly used for connecting PLCs to remote I/O systems?

A) Modbus

B) RS-232

C) Profibus

D) Ethernet/IP

Answer: A) Modbus

2498. What type of memory in a PLC is used to store the user's program and configurations?

A) RAM

B) ROM

C) EEPROM

D) Flash memory

Answer: C) EEPROM

2499. In PLC systems, which instruction is used to reset a counter to zero?

A) RES

B) CLR

C) CNT

D) RST

Answer: B) CLR

2500. Which of the following is an example of a "continuous" process controlled by a PLC system?

A) Conveyor belt operation

B) Temperature control in a furnace

C) Motor start/stop control

D) Part count on a production line

Answer: B) Temperature control in a furnace

2501. What is the role of the "analog output" module in a PLC system?

A) To convert analog signals into discrete values

B) To send continuous signals that vary in magnitude to external devices

C) To detect digital input values

D) To store data from external sensors

Answer: B) To send continuous signals that vary in magnitude to external devices

2502. What does the "XIO" instruction represent in ladder logic?

- A) A contact that is open when the input is true
- B) A timer function
- C) A memory bit
- D) A sensor that monitors input signals

Answer: A) A contact that is open when the input is true

2503. What is the purpose of a "set" instruction in a PLC program?

- A) To initiate a process
- B) To stop the execution of a process
- C) To set a bit to true
- D) To move data between memory locations

Answer: C) To set a bit to true

2504. What type of input device would most likely use a "proximity sensor" in a PLC-controlled system?

- A) Temperature measurement
- B) Position or movement detection
- C) Pressure monitoring
- D) Light intensity measurement

Answer: B) Position or movement detection

2505. What is the main purpose of a "power failure recovery" feature in a PLC?

- A) To automatically adjust the timing cycles
- B) To restore the PLC system to its previous state after a power outage
- C) To provide extra backup power during operation
- D) To optimize input signal processing

Answer: B) To restore the PLC system to its previous state after a power outage

2506. What is the advantage of using "Ethernet-based communication" for PLC systems?

- A) High speed and ease of integration with other networked devices
- B) Easier programming for complex systems
- C) Better fault tolerance and recovery mechanisms
- D) Low cost of implementation

Answer: A) High speed and ease of integration with other networked devices

2507. In a PLC, what type of memory is used to store the PLC program while the system is powered down?

- A) ROM
- B) RAM
- C) Flash memory
- D) EEPROM

Answer: C) Flash memory

2508. What does the "TOF" (Timer Off Delay) instruction do in a PLC program?

- A) It creates a delay before an output is activated
- B) It creates a delay before an output is deactivated
- C) It monitors input signals continuously
- D) It resets the timer to its initial state

Answer: B) It creates a delay before an output is deactivated

2509. Which of the following PLC devices typically interfaces with high-power actuators like motors?

- A) Digital output module
- B) Relay output module
- C) Analog output module
- D) Input module

Answer: B) Relay output module

2510. In a PLC system, which of the following is an example of a "discrete output"?

- A) A motor speed control
- B) A binary actuator like a solenoid valve
- C) A temperature control signal
- D) A continuous analog signal

Answer: B) A binary actuator like a solenoid valve

2511. What does the "MCR" (Master Control Reset) instruction do in ladder logic?

- A) Resets the system's configuration
- B) Clears a specified memory area
- C) Resets the entire program execution sequence
- D) Stops execution of the program and resets the conditions

Answer: D) Stops execution of the program and resets the conditions

2512. In a PLC system, what is typically controlled by an "analog input" module?

- A) A temperature sensor
- B) A switch
- C) A push button
- D) A proximity sensor

Answer: A) A temperature sensor

2513. What is the function of a "diagnostic display" in a PLC?

- A) To indicate the status of input/output devices
- B) To display real-time data from sensors
- C) To show system errors and troubleshooting information
- D) To execute control programs

Answer: C) To show system errors and troubleshooting information

2514. What does a "counter" instruction do in a PLC?

- A) It delays the activation of outputs
- B) It counts the number of times a condition is true
- C) It processes analog signals
- D) It resets timers

Answer: B) It counts the number of times a condition is true

2515. Which of the following PLC devices is responsible for converting digital signals to analog?

- A) Analog-to-digital converter (ADC)
- B) Digital-to-analog converter (DAC)
- C) Signal amplifier
- D) Relay module

Answer: B) Digital-to-analog converter (DAC)

2516. In a PLC program, which instruction is used to turn an output on or off based on a condition?

- A) Set/Reset
- B) MOVE
- C) JUMP
- D) AND

Answer: A) Set/Reset

2517. What does the "AND" instruction in ladder logic represent?

- A) It forces an output to turn on
- B) It combines two inputs, and the output is true only when both inputs are true
- C) It resets a timer
- D) It compares two inputs

Answer: B) It combines two inputs, and the output is true only when both inputs are true

2518. Which PLC instruction is used to toggle the state of an output?

A) NOT

B) TOF

C) SET

D) TGL

Answer: D) TGL

2519. What is the main advantage of using "remote I/O modules" in PLC systems?

A) Reduced wiring complexity

B) Increased processing speed

C) Improved control of local sensors

D) Simplified program logic

Answer: A) Reduced wiring complexity

2520. What is the main purpose of using a "data bus" in a PLC?

A) To provide communication between the CPU and peripheral devices

B) To store program data temporarily

C) To monitor external sensor inputs

D) To manage analog signals

Answer: A) To provide communication between the CPU and peripheral devices

2743. What type of sensor typically uses "digital I/O" in a PLC?

A) Temperature sensor

B) Pressure sensor

C) Limit switch

D) Flow sensor

Answer: C) Limit switch

2744. What is the purpose of the "Shift Register" instruction in a PLC?

- A) To move data from one register to another sequentially
- B) To control the position of actuators
- C) To set the state of an output based on a sequence of inputs
- D) To count up or down based on a set value

Answer: A) To move data from one register to another sequentially

2745. In PLC systems, which of the following best describes "safety relays"?

- A) They monitor system performance and provide feedback
- B) They ensure safe operation by interrupting dangerous outputs when necessary
- C) They amplify signals to improve accuracy
- D) They store data for later analysis

Answer: B) They ensure safe operation by interrupting dangerous outputs when necessary

2746. What is the primary function of a "PLC interface module"?

- A) To allow external devices to communicate with the PLC
- B) To store input/output data
- C) To convert signals to control actions
- D) To process control programs

Answer: A) To allow external devices to communicate with the PLC

2747. What does the "NOP" (No Operation) instruction do in PLC programming?

- A) It skips the current instruction and moves to the next one
- B) It performs a logical operation
- C) It holds the value of a variable
- D) It initializes system variables

Answer: A) It skips the current instruction and moves to the next one

2748. Which type of PLC communication is best for short-range data transmission between devices?

- A) Bluetooth
- B) RS-485
- C) Wi-Fi
- D) Zigbee

Answer: B) RS-485

2749. What is the primary difference between "discrete" and "analog" inputs in a PLC?

- A) Discrete inputs send continuous data, while analog inputs send binary signals
- B) Discrete inputs represent a true/false state, while analog inputs represent varying signals
- C) Analog inputs use more memory than discrete inputs
- D) Discrete inputs are slower than analog inputs

Answer: B) Discrete inputs represent a true/false state, while analog inputs represent varying signals

2750. What is the function of the "PID" control instruction in a PLC?

- A) To create a delay before activating outputs
- B) To control analog signals with proportional, integral, and derivative adjustments
- C) To count pulses from sensors
- D) To reset system variables

Answer: B) To control analog signals with proportional, integral, and derivative adjustments

2751. In a PLC, what does the "RES" instruction do?

- A) It resets a counter or timer to zero
- B) It sets a value to true
- C) It moves data between memory locations

D) It executes a subroutine

Answer: A) It resets a counter or timer to zero

2752. What is the purpose of an "HMI" (Human-Machine Interface) in a PLC system?

A) To provide a graphical interface for operators to monitor and control the system

B) To process input signals

C) To store the program data

D) To control system logic directly

Answer: A) To provide a graphical interface for operators to monitor and control the system

2753. Which PLC instruction is used to execute a block of code repeatedly?

A) JUMP

B) LOOP

C) SBR

D) MCR

Answer: B) LOOP

2754. What is the purpose of an "analog output" in a PLC system?

A) To control discrete devices

B) To generate continuous variable signals based on program logic

C) To provide feedback to operators

D) To store data in a non-volatile memory

Answer: B) To generate continuous variable signals based on program logic

2755. What is the main role of a "safety PLC"?

A) To manage communications between devices

B) To monitor and ensure safe operation in hazardous environments

C) To provide high-speed data processing

D) To control all PLC programming logic

Answer: B) To monitor and ensure safe operation in hazardous environments

2756. What is the primary function of a "watchdog timer" in a PLC system?

A) To monitor the temperature of the CPU

B) To reset the PLC in case of failure to execute properly

C) To provide feedback for troubleshooting

D) To adjust the timing of control operations

Answer: B) To reset the PLC in case of failure to execute properly

2757. Which of the following best describes a "virtual PLC"?

A) A physical PLC that operates in a computer simulation environment

B) A PLC that controls virtual machines in a digital environment

C) A PLC that is completely software-based and runs on a computer

D) A PLC used to simulate real-world PLC systems for training

Answer: C) A PLC that is completely software-based and runs on a computer

2758. What does the "XIC" (Examine If Closed) instruction in a PLC program do?

A) It checks if an input contact is closed and evaluates to true if it is

B) It checks if a counter has reached a set value

C) It activates an output when a condition is met

D) It compares two analog inputs

Answer: A) It checks if an input contact is closed and evaluates to true if it is

2759. What does the "NOP" (No Operation) instruction typically represent in a PLC program?

A) No change to the output

B) A placeholder where no action is required

C) A pause in program execution

D) A termination command for the system

Answer: B) A placeholder where no action is required

2760. In a PLC, which type of memory stores the user program?

A) RAM

B) ROM

C) EEPROM

D) Flash memory

Answer: B) ROM

2761. What is the advantage of using a "relay output module" in a PLC system?

A) It provides high-speed data processing

B) It controls high-power devices safely

C) It reduces the number of sensors needed

D) It allows for analog input processing

Answer: B) It controls high-power devices safely

2762. What does the "XIO" (Examine If Open) instruction do in a PLC program?

A) It checks if an input contact is open and evaluates to true if it is

B) It checks if an input contact is closed and evaluates to true if it is

C) It resets a counter

D) It executes a subroutine

Answer: A) It checks if an input contact is open and evaluates to true if it is

2763. Which of the following is used for storing long-term data in PLC systems?

A) RAM

B) ROM

C) EEPROM

D) Flash memory

Answer: C) EEPROM

2764. What is the primary function of the "Ladder Logic" programming language in PLC systems?

A) It represents control programs using graphical symbols that mimic relay logic

B) It converts digital signals into analog

C) It stores data for processing

D) It provides a command-line interface for system setup

Answer: A) It represents control programs using graphical symbols that mimic relay logic

2765. What does the "SBR" instruction in a PLC program represent?

A) It stores data

B) It calls a subroutine

C) It resets a memory block

D) It stops the execution of a program

Answer: B) It calls a subroutine

2766. In PLC systems, what is typically used to prevent electrical noise from affecting the inputs?

A) Surge protectors

B) Filters

C) Isolation relays

D) Light sensors

Answer: B) Filters

2767. What is the purpose of the "OTL" (Output Energize) instruction in ladder logic?

A) It energizes the output coil

- B) It de-energizes the output coil
- C) It performs a logical operation
- D) It sets a counter value

Answer: A) It energizes the output coil

2768. Which of the following describes a "counter" in PLC programming?

- A) A device used to perform arithmetic operations
- B) A variable that counts the number of times a condition is met
- C) A signal used to activate a relay
- D) A timer that counts in milliseconds

Answer: B) A variable that counts the number of times a condition is met

2769. What does the "PID" instruction in a PLC program primarily control?

- A) Discrete on/off devices
- B) Continuous variables like temperature, pressure, and flow
- C) Digital input and output states
- D) Sequential processing of events

Answer: B) Continuous variables like temperature, pressure, and flow

2770. In PLCs, what is typically used to detect the status of a device or sensor?

- A) Digital input modules
- B) Relay output modules
- C) Analog output modules
- D) Programmable data logging systems

Answer: A) Digital input modules

2771. Which of the following protocols is most commonly used for communication between PLCs and SCADA systems?

A) Modbus

B) RS-232

C) Profibus

D) CAN bus

Answer: A) Modbus

2772. What type of input signal is best detected by an analog input module in a PLC?

A) Binary signals like ON/OFF states

B) Continuous voltage or current signals

C) Pulse signals

D) Digital communication signals

Answer: B) Continuous voltage or current signals

2773. In a PLC, what is a "bit" used for?

A) Storing a single binary value, either 0 or 1

B) Storing a memory address

C) Representing complex data structures

D) Performing mathematical operations

Answer: A) Storing a single binary value, either 0 or 1

2774. Which of the following best describes the use of an "HMI" in a PLC system?

A) It provides the PLC with an input signal

B) It provides a visual interface for the operator to monitor and control the process

C) It stores the user program in the PLC

D) It communicates between different PLCs

Answer: B) It provides a visual interface for the operator to monitor and control the process

2775. In a PLC system, what is a "reset" instruction used for?

- A) To stop the program execution
- B) To set a timer or counter to its initial value
- C) To store data in memory
- D) To communicate with remote devices

Answer: B) To set a timer or counter to its initial value

2776. Which of the following is a common advantage of using a "modular PLC"?

- A) Lower cost for small systems
- B) Flexibility to expand by adding new modules as needed
- C) Better performance with complex operations
- D) Simplicity in programming

Answer: B) Flexibility to expand by adding new modules as needed

b. DC's System

2777. What does DCS stand for?

- A) Digital Control System
- B) Distributed Control System
- C) Direct Control System
- D) Dynamic Control System

Answer: B) Distributed Control System

2778. In a DCS, control functions are:

- A) Centralized
- B) Distributed across the system
- C) Manual

D) None of the above

Answer: B) Distributed across the system

2779. Which of the following is a primary advantage of using a DCS?

A) High-speed processing

B) Distributed control for improved reliability

C) Lower initial cost

D) Simplicity in design

Answer: B) Distributed control for improved reliability

2780. Which level in a DCS architecture typically handles supervisory control and data acquisition?

A) Level 0

B) Level 1

C) Level 2

D) Level 3

Answer: C) Level 2

2781. In a DCS, Level 0 refers to:

A) Field devices like sensors and actuators

B) Operator workstations

C) Supervisory control systems

D) Data storage systems

Answer: A) Field devices like sensors and actuators

2782. What is the function of a Human-Machine Interface (HMI) in a DCS?

A) Control field devices directly

B) Provide a graphical interface for operators

C) Store process data

D) Manage communication protocols

Answer: B) Provide a graphical interface for operators

2783. Which communication protocol is commonly used in DCS systems for device-level communication?

A) Modbus

B) OPC

C) Profibus

D) All of the above

Answer: D) All of the above

2784. What is the purpose of redundancy in a DCS?

A) To increase system performance

B) To improve system reliability

C) To decrease system cost

D) To simplify system integration

Answer: B) To improve system reliability

2785. Which of the following is NOT a typical component of a DCS?

A) Programmable Logic Controller (PLC)

B) Field I/O modules

C) Operator consoles

D) Supervisory computers

Answer: A) Programmable Logic Controller (PLC)

2786. What does "Hot Swap" refer to in a DCS context?

A) Replacing components while the system is powered on

B) High-temperature operations

C) Switching to a backup system

D) Quickly installing software updates

Answer: A) Replacing components while the system is powered on

2787. Which of the following is a typical input device used in DCS systems?

A) Temperature sensor

B) Control valve

C) Alarm buzzer

D) Display screen

Answer: A) Temperature sensor

2788. What is the purpose of loop checking in DCS programming?

A) To test the performance of the control loops

B) To verify the integrity of field device connections

C) To optimize control strategy parameters

D) To synchronize clocks across devices

Answer: B) To verify the integrity of field device connections

2789. Which of the following is a function of a DCS gateway?

A) To convert analog signals to digital signals

B) To translate between different communication protocols

C) To store historical process data

D) To provide power to field devices

Answer: B) To translate between different communication protocols

2790. Which of the following is NOT a typical feature of DCS programming software?

A) Simulation capabilities

B) Graphical user interface

C) Multitasking support

D) Voice recognition

Answer: D) Voice recognition

2791. What is the purpose of a watchdog timer in DCS hardware?

A) To monitor communication between devices

B) To prevent unauthorized access

C) To detect and recover from system faults

D) To synchronize clocks across devices

Answer: C) To detect and recover from system faults

2792. 16. Which of the following is an advantage of using Ethernet communication in DCS systems?

A) High data transmission speed

B) Low cost

C) Long distance communication

D) Immunity to electromagnetic interference

Answer: A) High data transmission speed

2793. Which of the following is a type of DCS controller architecture?

A) Centralized

B) Distributed

C) Hybrid

D) All of the above

Answer: D) All of the above

2794. Which programming language is commonly used for configuring control strategies in DCS systems?

A) C++

B) Ladder Logic

C) Python

D) Java

Answer: B) Ladder Logic

2795. Which communication protocol is commonly used in DCS systems for device-level communication?

A) Ethernet/IP

B) Modbus

C) Profibus

D) CANopen

Answer: B) Modbus

2796. What is the purpose of a DCS controller?

A) To regulate the temperature of the plant

B) To process data from field devices and send control signals

C) To monitor the production schedule

D) To manage inventory

Answer: B) To process data from field devices and send control signals

2797. What is the primary function of a DCS in process industries?

A) To automate manufacturing processes

B) To monitor environmental conditions

C) To control financial transactions

D) To manage human resources

Answer: A) To automate manufacturing processes

2798. Which of the following is a common method for integrating DCS systems with enterprise-level software?

- A) OPC (OLE for Process Control)
- B) SNMP (Simple Network Management Protocol)
- C) MQTT (Message Queuing Telemetry Transport)
- D) BACnet (Building Automation and Control Networks)

Answer: A) OPC (OLE for Process Control)

2799. What is the purpose of an HMI in a DCS system?

- A) To store process data
- B) To configure control strategies
- C) To provide a graphical interface for operators
- D) To control field devices directly

Answer: C) To provide a graphical interface for operators

2800. Which of the following is an example of a redundant configuration in DCS hardware?

- A) Hot standby
- B) Cold standby
- C) Warm standby
- D) All of the above

Answer: D) All of the above

2801. Which of the following is a benefit of using distributed control in DCS systems?

- A) Reduced wiring complexity
- B) Lower initial cost
- C) Higher processing speed

D) Limited scalability

Answer: A) Reduced wiring complexity

2802. Which communication protocol is commonly used for high-speed communication between DCS controllers and I/O modules?

A) Foundation Fieldbus

B) HART

C) Profibus DP

D) CANopen

Answer: C) Profibus DP

2803. Which of the following is a field device in a DCS system?

A) Programmable Logic Controller (PLC)

B) Human-Machine Interface (HMI)

C) Flow sensor

D) Operator console

Answer: C) Flow sensor

2804. Which of the following is NOT a typical communication medium used in DCS systems?

A) Ethernet

B) RS-232

C) Fiber optic

D) Pneumatic tubing

Answer: D) Pneumatic tubing

2805. Which of the following best describes the concept of "fail-safe" in a DCS?

A) Automatic system shutdown in case of failure

B) Continuous operation without any failure

C) System design to operate safely under fault conditions

D) Manual intervention to handle failures

Answer: C) System design to operate safely under fault conditions

2806. In a DCS, what does the term "I/O" refer to?

A) Input

B) Interface Operation

C) Input / Output

D) Internal Optimization

Answer: C) Input / Output

2807. What is the role of a DCS engineering workstation?

A) Monitoring alarms only

B) Viewing trends and reports only

C) Programming and configuring the control system

D) Operating the process

Answer: C) Programming and configuring the control system

2808. Which of the following is a major advantage of using Foundation Fieldbus in DCS?

A) Low speed

B) Wired redundancy

C) Device-level diagnostics and control

D) Limited interoperability

Answer: C) Device-level diagnostics and control

2809. The term “scan time” in DCS refers to:

A) Time taken to boot up the system

B) Time taken to scan all inputs, process logic, and update outputs

C) Time taken to log data

D) Time taken for maintenance

Answer: B) Time taken to scan all inputs, process logic, and update outputs

2810. DCS is best suited for which type of processes?

A) Discrete control

B) Batch control

C) Continuous control

D) Manual control

Answer: C) Continuous control

2811. The term “soft redundancy” in a DCS implies:

A) Hardware backup

B) Manual backup

C) Software-based fault tolerance

D) None of the above

Answer: C) Software-based fault tolerance

2812. What does the term “interlock” mean in DCS programming?

A) Process synchronization

B) Manual override

C) Prevents unsafe or undesired operation

D) None of the above

Answer: C) Prevents unsafe or undesired operation

2813. Which of the following is a benefit of trending in DCS?

A) Reset alarms

B) Format the control logic

C) Analyze process behavior over time

D) Communicate with PLCs

Answer: C) Analyze process behavior over time

2814. What does FBD stand for in DCS programming languages?

A) Field Bus Design

B) Functional Block Diagram

C) Fixed Base Design

D) Field-Based Diagnostics

Answer: B) Functional Block Diagram

2815. Which of the following is NOT commonly used in DCS operator consoles?

A) Graphical process displays

B) Alarm summary windows

C) Control panel dials

D) Historical trend views

Answer: C) Control panel dials

2816. What is the function of an analog input module in DCS?

A) Generate alarms

B) Convert digital signals to analog

C) Convert analog signals to digital

D) Control actuator movement

Answer: C) Convert analog signals to digital

2817. DCS backup and restore procedures are important for:

A) Reducing sensor cost

B) Protecting system against viruses

C) Recovering system after hardware/software failure

D) Increasing scan speed

Answer: C) Recovering system after hardware/software failure

2818. Which type of data is typically stored in the DCS historian?

A) User credentials

B) Production recipes only

C) Real-time and historical process data

D) Maintenance manuals

Answer: C) Real-time and historical process data

2819. A typical redundancy in a DCS controller means:

A) Single controller with backup memory

B) One controller with two operator stations

C) Dual controllers operating in parallel

D) Separate control room backup

Answer: C) Dual controllers operating in parallel

2820. Why are diagnostics important in a DCS?

A) To improve graphics

B) To track operator login

C) To detect system faults or degradation early

D) To reduce scan time

Answer: C) To detect system faults or degradation early

2821. What does the "control loop" in a DCS refer to?

A) A circular wiring system

B) The connection between operator and software

- C) A continuous process of measurement, comparison, and correction
- D) Manual calibration process

Answer: C) A continuous process of measurement, comparison, and correction

2822. Which type of controller is most commonly used in a DCS?

- A) PID Controller
- B) PLC
- C) On/Off Controller
- D) SCADA Unit

Answer: A) PID Controller

2823. Which of the following is NOT a common alarm type in DCS?

- A) High alarm
- B) Low alarm
- C) Medium alarm
- D) Critical alarm

Answer: C) Medium alarm

2824. What is the function of a control strategy in DCS?

- A) To create alarms
- B) To manage user interfaces
- C) To define logic for process control
- D) To generate reports

Answer: C) To define logic for process control

2825. What is HART communication protocol mainly used for in DCS systems?

- A) Remote user login
- B) Data encryption

C) Digital communication with smart field devices over analog wiring

D) Wireless communication only

Answer: C) Digital communication with smart field devices over analog wiring

2826. What is a node in the context of a DCS network?

A) A wiring connector

B) A backup drive

C) Any device connected to the control network

D) A special PLC

Answer: C) Any device connected to the control network

2827. What is the main function of I/O modules in DCS?

A) Display graphics

B) Provide network security

C) Interface between field devices and controllers

D) Connect power to sensors

Answer: C) Interface between field devices and controllers

2828. Which of the following is typically NOT used for DCS network communication?

A) RS-485

B) Ethernet

C) Profibus

D) USB

Answer: D) USB

2829. What is a “control room” in a DCS environment?

A) A field wiring cabinet

B) An area containing operator interfaces and supervisory systems

- C) A maintenance department
- D) A workshop for field devices

Answer: B) An area containing operator interfaces and supervisory systems

2830. What is the function of a historian in a DCS system?

- A) Manage users
- B) Perform PID control
- C) Store long-term process data
- D) Display real-time alarms

Answer: C) Store long-term process data

2831. What does “latency” mean in the context of DCS communication?

- A) Power loss
- B) The delay in data transmission
- C) Voltage drop
- D) A backup system failure

Answer: B) The delay in data transmission

2832. What does OPC stand for in DCS integration?

- A) Operational Process Control
- B) Open Protocol Communication
- C) OLE for Process Control
- D) Operator Process Console

Answer: C) OLE for Process Control

2833. The main difference between DCS and SCADA is:

- A) SCADA is faster
- B) DCS is centralized

C) DCS provides local control; SCADA is supervisory

D) SCADA uses analog signals only

Answer: C) DCS provides local control; SCADA is supervisory

2834. What is a typical function of the alarm management system in DCS?

A) Drawing logic diagrams

B) Displaying and prioritizing alerts for operators

C) Backing up I/O modules

D) Handling Ethernet settings

Answer: B) Displaying and prioritizing alerts for operators

2835. Which of the following best describes a DCS control loop?

A) Manually adjusted

B) Based on time

C) Feedback-based process regulation

D) One-time setup process

Answer: C) Feedback-based process regulation

2836. What happens if the DCS controller fails without redundancy?

A) The system operates normally

B) The operator takes over manually

C) The process may stop or become unsafe

D) It switches to SCADA automatically

Answer: C) The process may stop or become unsafe

2837. Which part of a DCS system is responsible for real-time control?

A) Historian

B) Operator workstation

C) Controller

D) Alarm server

Answer: C) Controller

2838. What is the main advantage of using fiber optic cables in DCS networking?

A) Cost-effective

B) Easy to splice

C) Immune to electrical noise

D) Compatible with analog signals

Answer: C) Immune to electrical noise

2839. In a typical DCS, which of the following is true about alarm priorities?

A) All alarms have equal importance

B) Priorities are randomly assigned

C) Alarms are classified by criticality

D) Alarms are not used in DCS

Answer: C) Alarms are classified by criticality

2840. What is the key feature of a redundant power supply in DCS?

A) Reduced cost

B) Energy saving

C) Continuous power availability

D) Faster signal processing

Answer: C) Continuous power availability

2841. What does "loop tuning" in DCS involve?

A) Configuring alarm thresholds

B) Adjusting PID parameters

C) Setting up user passwords

D) Connecting devices to the network

Answer: B) Adjusting PID parameters

2842. What is the role of a communication bus in DCS?

A) Power supply

B) Data transmission among components

C) Manual control system

D) Hardware backup

Answer: B) Data transmission among components

2843. In DCS, what is meant by "control logic"?

A) The process diagram

B) Set of rules and operations for process automation

C) Operator actions

D) User interface layout

Answer: B) Set of rules and operations for process automation

2844. What does "scalability" in DCS refer to?

A) Ability to be used in all industries

B) Resistance to external faults

C) Capacity to grow with system expansion

D) Accuracy of sensors

Answer: C) Capacity to grow with system expansion

2845. What is the purpose of a graphics builder tool in DCS?

A) Drawing piping schematics

B) Designing operator interface screens

C) Testing field instruments

D) Analyzing controller speed

Answer: B) Designing operator interface screens

2846. In a redundant DCS controller setup, if the primary controller fails, what happens?

A) The process stops

B) The operator must restart it

C) The backup controller automatically takes over

D) The HMI reboots

Answer: C) The backup controller automatically takes over

2847. What is “setpoint” in DCS terminology?

A) The alarm trigger point

B) The measured variable

C) The desired value for a process variable

D) The manual override level

Answer: C) The desired value for a process variable

2848. Which of the following is commonly used for analog signal transmission in field instrumentation?

A) 12–24V DC

B) 10–50 mA

C) 4–20 mA

D) 0–240 V AC

Answer: C) 4–20 mA

2849. What is the benefit of modular I/O architecture in DCS?

A) Slower processing

B) Easier to replace components

C) Inflexible installation

D) Increases wiring

Answer: B) Easier to replace components

2850. What is the meaning of "dead time" in a control loop?

A) Time to initiate alarms

B) Time taken by the operator to act

C) Delay between input change and output response

D) Duration of power failure

Answer: C) Delay between input change and output response

2851. Which of the following is an analog output device?

A) Temperature transmitter

B) Pressure sensor

C) Control valve

D) Proximity switch

Answer: C) Control valve

2852. What is a "tag" in DCS?

A) A software license

B) A process variable with a unique identifier

C) A sensor wire

D) A security credential

Answer: B) A process variable with a unique identifier

2853. In DCS, what is trending used for?

A) Creating backup

B) Real-time and historical data analysis

C) Controlling motors

D) Programming controllers

Answer: B) Real-time and historical data analysis

2854. Why is grounding important in a DCS system?

A) Increases signal strength

B) Ensures power distribution

C) Protects equipment from electrical surges and noise

D) Enhances visual layout

Answer: C) Protects equipment from electrical surges and noise

2855. What is the typical unit used for measuring analog signal voltage in DCS systems?

A) Ohm

B) Hertz

C) Volts

D) Ampere

Answer: C) Volts

2856. What is the term for a sudden increase in signal value that may trigger a false alarm?

A) Deadband

B) Noise

C) Spike

D) Drift

Answer: C) Spike

2857. What is meant by "cold start" in a DCS system?

A) Restarting a controller while it's in operation

B) Restarting the system from a completely powered-off state

C) Replacing a module during operation

D) Running diagnostics

Answer: B) Restarting the system from a completely powered-off state

2858. Which of the following is commonly used for DCS programming logic?

A) HTML

B) SQL

C) Ladder Logic

D) BASIC

Answer: C) Ladder Logic

2859. What does a “historian server” do in a DCS environment?

A) Manages passwords

B) Stores and retrieves process data over time

C) Sends control signals

D) Manages hardware backups

Answer: B) Stores and retrieves process data over time

2860. A PID loop in a DCS system helps to:

A) Read-only sensor data

B) Maintain a process variable at a setpoint

C) Turn systems on/off

D) Backup system files

Answer: B) Maintain a process variable at a setpoint

2861. What does “real-time control” in DCS imply?

A) Process control based on historical data

B) Control action occurs with no delay

C) Scheduled manual inputs

D) Delayed response system

Answer: B) Control action occurs with no delay

2862. What is the most common cause of noise in analog signal transmission?

A) Software bugs

B) Electrical interference

C) Operator error

D) Poor grounding

Answer: B) Electrical interference

2863. What is an RTD used for in DCS systems?

A) Flow measurement

B) Pressure control

C) Temperature measurement

D) Level indication

Answer: C) Temperature measurement

2864. Which of the following DCS components would most likely use a UPS (Uninterruptible Power Supply)?

A) Control valves

B) Field transmitters

C) Operator workstations and controllers

D) RTDs

Answer: C) Operator workstations and controllers

2865. What is the primary difference between analog and digital signals in DCS?

A) Analog signals are less reliable

B) Digital signals are continuous

C) Analog signals vary continuously, digital signals are discrete

D) Analog uses only fiber optics

Answer: C) Analog signals vary continuously, digital signals are discrete

2866. Which part of the DCS acts as the interface between sensors/actuators and the controller?

A) Power module

B) HMI

C) I/O module

D) Historian

Answer: C) I/O module

2867. What does redundancy in network topology prevent in DCS systems?

A) Process tuning

B) Manual override

C) Total communication failure

D) Control logic optimization

Answer: C) Total communication failure

2868. A DCS control loop alarm is typically triggered when:

A) The PID loop starts

B) The power supply fails

C) A process variable exceeds a set threshold

D) Data is logged

Answer: C) A process variable exceeds a set threshold

2869. What is meant by “scan rate” in DCS?

A) The speed of Ethernet transmission

- B) Rate at which alarms are acknowledged
- C) Frequency at which the system updates I/O values
- D) File scan for viruses

Answer: C) Frequency at which the system updates I/O values

2870. What happens in DCS if a sensor fails and no redundancy is available?

- A) The system continues with average values
- B) Operator is notified through alarm
- C) Control is handed to PLC
- D) Controller reboots

Answer: B) Operator is notified through alarm

2871. What is meant by “deadband” in control systems?

- A) Signal delay time
- B) Range within which no control action is taken
- C) Power failure margin
- D) Maximum control loop range

Answer: B) Range within which no control action is taken

2872. In which scenario would a DCS use a batch control strategy?

- A) Oil refining
- B) Water treatment
- C) Pharmaceutical production
- D) Power generation

Answer: C) Pharmaceutical production

2873. What is one of the biggest operational benefits of a DCS compared to traditional control panels?

- A) Fewer safety rules
- B) Less training
- C) Centralized monitoring and control of complex systems
- D) Faster manual intervention

Answer: C) Centralized monitoring and control of complex systems

2874. Which feature of DCS helps maintain continuous control in case of component failure?

- A) Modularity
- B) Redundancy
- C) Alarm management
- D) SCADA integration

Answer: B) Redundancy

2875. What does a digital output module in a DCS typically control?

- A) Transmitters
- B) Sensors
- C) Actuators or relays
- D) Graphic displays

Answer: C) Actuators or relays

2876. In DCS systems, why is a time synchronization protocol used?

- A) Reduce scan time
- B) Ensure consistent timestamping across devices
- C) Compress data
- D) Control loop speed

Answer: B) Ensure consistent timestamping across devices

2877. Which part of a DCS system logs operator actions for audit purposes?

- A) Controller
- B) Alarm Manager
- C) Event Logger
- D) Historian

Answer: C) Event Logger

2878. What is the main benefit of using a virtualized DCS system?

- A) Reduced memory usage
- B) Lower field wiring
- C) Flexibility in deployment and easier maintenance
- D) Faster alarm generation

Answer: C) Flexibility in deployment and easier maintenance

2879. In DCS, the “loop status” typically indicates:

- A) The password level of the user
- B) The physical condition of a valve
- C) Whether the control loop is in manual, auto, or cascade mode
- D) Network signal strength

Answer: C) Whether the control loop is in manual, auto, or cascade mode

2880. What is the function of a soft controller in a DCS system?

- A) Provides remote backup
- B) Acts as a virtual controller running on a PC
- C) Replaces PLCs
- D) Only handles alarms

Answer: B) Acts as a virtual controller running on a PC

2881. What is the main difference between manual and automatic control in DCS?

A) Manual uses Ethernet

B) Automatic uses paper log sheets

C) In manual, the operator adjusts outputs; in automatic, the controller does

D) Both work the same

Answer: C) In manual, the operator adjusts outputs; in automatic, the controller does

2882. Which component of DCS is used to create and edit logic for process control?

A) Historian

B) HMI

C) Engineering workstation

D) Control valve

Answer: C) Engineering workstation

2883. A "watchdog timer" in DCS is used for:

A) Loop tuning

B) Time synchronization

C) Detecting and recovering from controller faults

D) Managing user access

Answer: C) Detecting and recovering from controller faults

2884. In DCS, what does the term "failover" refer to?

A) Resetting the alarm system

B) Powering down a module

C) Automatic switch to backup system upon failure

D) Logging system error

Answer: C) Automatic switch to backup system upon failure

2885. What is meant by "process variable" (PV) in DCS terminology?

- A) The operator's desired setting
 - B) The output value
 - C) The actual measured value from the field
 - D) The backup system value
- Answer: C) The actual measured value from the field

2886. A "setpoint" in DCS control is:

- A) The lowest possible reading
 - B) The initial value
 - C) The desired target value for the process
 - D) The calculated error
- Answer: C) The desired target value for the process

2887. In DCS, "cascade control" involves:

- A) Two or more controllers working in series
 - B) One loop controlling another in parallel
 - C) Two alarms triggering simultaneously
 - D) A redundant loop
- Answer: A) Two or more controllers working in series

2888. What is "alarm flooding" in DCS?

- A) High-pressure valve failure
 - B) A large number of alarms activated at once, overwhelming the operator
 - C) Failure of alarm speakers
 - D) Increased data logging
- Answer: B) A large number of alarms activated at once, overwhelming the operator

2889. What is the common voltage range for digital signals in DCS?

A) 0–5 V or 0–24 V DC

B) 4–20 mA

C) 220–240 V AC

D) 0–10 A

Answer: A) 0–5 V or 0–24 V DC

2890. Which DCS element helps operators understand trends and patterns over time?

A) Alarm list

B) Setpoint table

C) Trend chart

D) Loop status window

Answer: C) Trend chart

2891. Which type of DCS signal represents ON/OFF states?

A) Analog signal

B) Digital signal

C) HART signal

D) Serial signal

Answer: B) Digital signal

2892. What is the purpose of calibration in a DCS-controlled field device?

A) Reset controller

B) Align device readings with known standards

C) Upgrade firmware

D) Improve user interface

Answer: B) Align device readings with known standards

2893. Which DCS communication protocol provides both power and communication over the same wire?

- A) Modbus
- B) Profibus
- C) HART
- D) Foundation Fieldbus

Answer: D) Foundation Fieldbus

2894. What is the role of the “operator station” in a DCS system?

- A) Field wiring interface
- B) Control room power panel
- C) Human interface for monitoring and controlling the process
- D) I/O module backup

Answer: C) Human interface for monitoring and controlling the process

2895. What is a common use of loopback testing in DCS?

- A) Simulate I/O wiring faults
- B) Verify input and output communication paths
- C) Set user passwords
- D) Load control strategies

Answer: B) Verify input and output communication paths

2896. In a DCS, which of the following is used to program and configure the system logic?

- A) Controller
- B) Fieldbus
- C) Engineering workstation
- D) Operator HMI

Answer: C) Engineering workstation

2897. What is the key advantage of distributed control in a DCS?

- A) Simplifies control logic
- B) Reduces wiring complexity and system downtime
- C) Eliminates the need for maintenance
- D) Increases power consumption

Answer: B) Reduces wiring complexity and system downtime

2898. What is an “I/O module” in a DCS system?

- A) A device that records alarms
- B) A communication network hub
- C) A component that interfaces with field devices (sensors and actuators)
- D) A software tool for engineering

Answer: C) A component that interfaces with field devices (sensors and actuators)

2899. Which of the following protocols is often used for communication between a DCS and field instruments?

- A) TCP/IP
- B) HART
- C) CAN
- D) Bluetooth

Answer: B) HART

2900. What is a significant disadvantage of using single-loop controllers in large-scale DCS applications?

- A) Expensive installation
- B) Difficulty in managing multiple variables
- C) Risk of overheating

D) Complexity in wiring

Answer: B) Difficulty in managing multiple variables

2901. What is the function of a digital signal processor (DSP) in a DCS system?

A) To manage network traffic

B) To filter and process real-time signals

C) To provide power to sensors

D) To log process data for later analysis

Answer: B) To filter and process real-time signals

2902. What is the purpose of a DCS historian?

A) Stores and tracks system configurations

B) Stores real-time process data for later analysis

C) Monitors alarm status

D) Detects system failures

Answer: B) Stores real-time process data for later analysis

2903. In a DCS, which of the following components is typically responsible for monitoring control loops?

A) Event logger

B) Controller

C) Operator station

D) Historian

Answer: B) Controller

2904. How is "fault tolerance" achieved in a DCS system?

A) Using lightweight components

B) Using redundancy and backup systems

C) Installing more sensors

D) Increasing the number of operator stations

Answer: B) Using redundancy and backup systems

2905. What does “signal conditioning” do in a DCS system?

A) Converts signals from analog to digital

B) Detects and corrects sensor failures

C) Converts, filters, and amplifies signals for processing

D) Regulates voltage levels in the system

Answer: C) Converts, filters, and amplifies signals for processing

2906. What kind of interface is typically used between an operator and a DCS system?

A) Text-based interface

B) HMI (Human-Machine Interface)

C) Voice command system

D) Physical control panel with switches

Answer: B) HMI (Human-Machine Interface)

2907. Which of the following is true about the communication in a DCS?

A) DCS communication is typically one-way

B) DCS uses a closed-loop communication structure

C) DCS uses open-source protocols

D) DCS communication typically requires no error-checking

Answer: B) DCS uses a closed-loop communication structure

2908. What is the function of an actuator in a DCS?

A) Monitors temperature

B) Converts electrical signals to physical action (e.g., moving a valve)

C) Records alarms

D) Stores process data

Answer: B) Converts electrical signals to physical action (e.g., moving a valve)

2909. What does the term “loop tuning” refer to in DCS systems?

A) Adjusting alarm limits

B) Modifying PID controller parameters to optimize control loop performance

C) Changing the system wiring

D) Configuring backup controllers

Answer: B) Modifying PID controller parameters to optimize control loop performance

2910. What is a major consideration when selecting I/O modules for a DCS?

A) Their energy consumption

B) Their compatibility with sensors and actuators

C) Their color coding

D) Their network bandwidth

Answer: B) Their compatibility with sensors and actuators

2911. Which DCS component is responsible for ensuring that the system operates continuously during power loss?

A) Redundant controller

B) Uninterruptible Power Supply (UPS)

C) HMI

D) Event Logger

Answer: B) Uninterruptible Power Supply (UPS)

2912. What kind of system is best suited for real-time control of continuous processes?

A) Distributed Control System (DCS)

- B) Supervisory Control and Data Acquisition (SCADA)
- C) Programmable Logic Controller (PLC)
- D) Batch Control System

Answer: A) Distributed Control System (DCS)

2913. In a DCS, what is the function of the “backup controller”?

- A) Stores operator interface configurations
- B) Automatically takes control in case of primary controller failure
- C) Configures the network topology
- D) Monitors environmental variables

Answer: B) Automatically takes control in case of primary controller failure

2914. What is the purpose of the “dead time” in process control loops?

- A) Time between input change and system output response
- B) Time for the operator to acknowledge an alarm
- C) Time taken for data logging
- D) Time to process historical data

Answer: A) Time between input change and system output response

2915. In DCS, what does the term "open-loop control" mean?

- A) Control where feedback from the system is used to adjust the input
- B) Control where the input is fixed and no feedback is used
- C) Control with automatic alarms
- D) Control with constant power supply

Answer: B) Control where the input is fixed and no feedback is used

2916. Which of the following is an example of a field device used in a DCS system?

- A) Operator workstation

B) Fieldbus cable

C) Temperature transmitter

D) Event logger

Answer: C) Temperature transmitter

2917. What is the primary function of the “control loop” in a DCS?

A) To monitor alarms

B) To adjust output based on feedback from input variables

C) To store historical data

D) To maintain network security

Answer: B) To adjust output based on feedback from input variables

2918. What is meant by “latency” in the context of a DCS?

A) The time taken to transfer data between devices

B) The speed of data storage

C) The power consumption of controllers

D) The response time of actuators

Answer: A) The time taken to transfer data between devices

2919. Which of the following is the typical communication standard used in DCS for field devices?

A) Ethernet TCP/IP

B) Profibus

C) CAN bus

D) HART

Answer: D) HART

2920. What does the term “redundancy” refer to in a DCS?

- A) Using a single controller for all operations
 - B) Backup systems to ensure continuous operation in case of failure
 - C) Increasing the number of alarms
 - D) Removing obsolete components
- Answer: B) Backup systems to ensure continuous operation in case of failure

2921. What is an example of a discrete signal in a DCS system?

- A) Temperature reading
- B) Pressure reading
- C) On/Off valve control
- D) Flow rate measurement

Answer: C) On/Off valve control

2922. Which of the following is typically used to reduce electrical noise in DCS signal transmission?

- A) Data compression
- B) Shielded cables
- C) Increased voltage levels
- D) Multiple communication protocols

Answer: B) Shielded cables

2923. Which component of a DCS is responsible for executing the control algorithm?

- A) Sensor
- B) Controller
- C) Actuator
- D) Operator station

Answer: B) Controller

2924. What is the purpose of using a "relay" in a DCS system?

- A) To measure the process variable
- B) To provide digital control for high-power devices
- C) To store process data
- D) To monitor the network status

Answer: B) To provide digital control for high-power devices

2925. In a DCS, how is process data typically logged for later analysis?

- A) Event logs
- B) Historical trend charts
- C) Alarms
- D) Data historians

Answer: D) Data historians

2926. Which of the following is a typical use case for a DCS?

- A) Large-scale continuous manufacturing processes like refining and chemical plants
- B) Home automation systems
- C) Managing small embedded systems
- D) Desktop computing

Answer: A) Large-scale continuous manufacturing processes like refining and chemical plants

2927. How does a "PID controller" function in a DCS?

- A) It measures the temperature of the system
- B) It continuously adjusts control variables based on error between setpoint and actual value
- C) It stores alarm logs
- D) It simulates process dynamics

Answer: B) It continuously adjusts control variables based on error between setpoint and actual

value

2928. What does a "modbus" protocol in DCS typically handle?

- A) High-speed data transfer for real-time applications
- B) Communication between control devices like PLCs and field instruments
- C) Alarm management
- D) Control of high-voltage equipment

Answer: B) Communication between control devices like PLCs and field instruments

2929. In DCS, what does the term "trend analysis" refer to?

- A) The analysis of past system failures
- B) Identifying patterns in process data over time
- C) Identifying data bottlenecks
- D) Forecasting market trends

Answer: B) Identifying patterns in process data over time

2930. What is the main purpose of the Human-Machine Interface (HMI) in a DCS system?

- A) To provide a user interface for configuring network settings
- B) To display system status, alarms, and allow for manual control and adjustments
- C) To control the power supply
- D) To configure data storage for historical records

Answer: B) To display system status, alarms, and allow for manual control and adjustments

2931. Which of the following is typically used for real-time process monitoring in a DCS?

- A) Historical database
- B) Event log
- C) Alarm console

D) Trend display

Answer: D) Trend display

2932. What is the role of a "safety instrumented system" (SIS) in a DCS environment?

A) To improve user interface design

B) To ensure safe operations by taking corrective action in hazardous conditions

C) To manage alarms and event logs

D) To enhance data storage capacity

Answer: B) To ensure safe operations by taking corrective action in hazardous conditions

2933. In DCS, what is the purpose of using a "scalable" system design?

A) To allow easy scaling of hardware as needed

B) To increase security by limiting data flow

C) To minimize communication network errors

D) To improve operator response time

Answer: A) To allow easy scaling of hardware as needed

2934. What is the significance of using "time synchronization" in DCS systems?

A) To ensure accurate timestamps for alarms and data logs

B) To synchronize the controllers with operator workstations

C) To manage database storage

D) To control actuator timing

Answer: A) To ensure accurate timestamps for alarms and data logs

2935. Which of the following devices is used to measure flow rate in a DCS system?

A) Thermocouple

B) Flow meter

C) Pressure gauge

D) Level transmitter

Answer: B) Flow meter

2936. What is the function of a “backup power supply” in a DCS?

A) To prevent system downtime in case of power failure

B) To monitor network traffic

C) To store historical data

D) To log alarms

Answer: A) To prevent system downtime in case of power failure

2937. What is the purpose of a “remote I/O” in a DCS?

A) To provide operator control from a distance

B) To process data locally in field devices

C) To extend the reach of the DCS to distant devices without wiring back to the main controller

D) To store historical data remotely

Answer: C) To extend the reach of the DCS to distant devices without wiring back to the main controller

2938. What is the role of the “alarm system” in a DCS?

A) To generate real-time reports for operators

B) To detect abnormal conditions and notify operators of potential issues

C) To control actuators based on predefined conditions

D) To manage system backups

Answer: B) To detect abnormal conditions and notify operators of potential issues

2939. What does the term “digital I/O” refer to in DCS?

A) Input and output signals that are processed in a digital format (binary signals: ON/OFF)

B) Process data logged for analysis

C) Control actions based on analog values

D) Data signals processed over Ethernet

Answer: A) Input and output signals that are processed in a digital format (binary signals: ON/OFF)

2940. In DCS, which device is typically responsible for converting analog signals into digital form?

A) Field transmitter

B) Analog-to-Digital Converter (ADC)

C) Controller

D) Operator station

Answer: B) Analog-to-Digital Converter (ADC)

2941. What is the main advantage of using "Fieldbus" technology in DCS?

A) It reduces the number of I/O modules

B) It allows for bi-directional communication between field devices and controllers

C) It increases the response time of control loops

D) It is only used for alarm management

Answer: B) It allows for bi-directional communication between field devices and controllers

2942. Which of the following is used to prevent unauthorized access to a DCS system?

A) Redundant controllers

B) Passwords and user access controls

C) Event logging

D) Remote I/O

Answer: B) Passwords and user access controls

2943. What is the function of a "data historian" in a DCS?

A) It stores real-time process data for later analysis and reporting

B) It continuously monitors for alarms

C) It manages field device calibration

D) It provides real-time control of the system

Answer: A) It stores real-time process data for later analysis and reporting

2944. Which of the following types of control is primarily used for discrete processes in DCS?

A) PID control

B) On/Off control

C) Cascade control

D) Adaptive control

Answer: B) On/Off control

2945. Which component of a DCS typically generates alarms when process parameters exceed predefined limits?

A) Controller

B) Sensor

C) Alarm management system

D) Actuator

Answer: C) Alarm management system

2946. What is the role of the "communications bus" in a DCS system?

A) To provide a pathway for data to be shared between controllers, I/O devices, and operator workstations

B) To store process data

C) To manage network security

D) To control actuators

Answer: A) To provide a pathway for data to be shared between controllers, I/O devices, and operator workstations

2947. Which of the following is a common feature of modern DCS systems?

- A) Use of analog signals only
- B) Integration of field devices with Ethernet/IP communication
- C) Only manual control of processes
- D) No use of feedback loops

Answer: B) Integration of field devices with Ethernet/IP communication

2948. What is "predictive maintenance" in the context of DCS?

- A) Maintenance performed only when equipment fails
- B) Predicting when maintenance will be required based on system performance data
- C) Scheduled maintenance based on time intervals
- D) Manual checks for each system component

Answer: B) Predicting when maintenance will be required based on system performance data

2949. Which of the following DCS components is essential for ensuring reliable data storage and retrieval?

- A) Event Logger
- B) Data Historian
- C) Field Device
- D) Remote Terminal Unit (RTU)

Answer: B) Data Historian

2950. Which DCS element allows for remote monitoring and control of processes?

- A) Operator station
- B) Controller
- C) Remote I/O

D) VPN

Answer: D) VPN

2951. What is the main purpose of using "redundancy" in a DCS control system?

A) To reduce power consumption

B) To ensure system availability and prevent downtime in case of failure

C) To increase the processing speed

D) To prevent unnecessary alarms

Answer: B) To ensure system availability and prevent downtime in case of failure

2952. What does "alarm suppression" refer to in a DCS system?

A) Ignoring all alarms for specific periods

B) Temporarily disabling non-critical alarms to avoid flooding the operator

C) Automatically generating alarms for every minor change

D) Preventing the controller from operating

Answer: B) Temporarily disabling non-critical alarms to avoid flooding the operator

2953. In a DCS, what type of device would be used to provide feedback for process control?

A) Sensor

B) Actuator

C) Controller

D) Operator station

Answer: A) Sensor

2954. What is a "state machine" used for in a DCS?

A) Monitoring the state of controllers

B) Executing predefined sequences of operations based on system status

C) Storing process data

D) Measuring temperatures

Answer: B) Executing predefined sequences of operations based on system status

2955. What is the main advantage of integrating SCADA with a DCS?

A) SCADA can control the process directly

B) SCADA can provide remote monitoring and control over large distances

C) SCADA is only used for data logging

D) SCADA can process data faster than a DCS

Answer: B) SCADA can provide remote monitoring and control over large distances

2956. What is the purpose of using “batch processing” in a DCS-controlled system?

A) For continuous, real-time control

B) To produce small, discrete quantities of product in a series of steps

C) To allow for manual control at all times

D) To control a large number of parallel processes simultaneously

Answer: B) To produce small, discrete quantities of product in a series of steps

2957. What does the acronym "HMI" stand for in a DCS system?

A) High-Machine Interface

B) Human-Machine Interface

C) Hybrid-Machine Integration

D) Horizontal-Module Interface

Answer: B) Human-Machine Interface

2958. What is the role of “control loops” in a DCS?

A) To manage operator interactions

B) To monitor the health of network devices

C) To automatically adjust system variables based on feedback

D) To generate alarm signals when thresholds are breached

Answer: C) To automatically adjust system variables based on feedback

2959. What is the purpose of using a “centralized control room” in a DCS system?

A) To reduce the need for operator involvement

B) To allow operators to monitor and control the entire process from a single location

C) To improve the accuracy of field device calibration

D) To store historical data from the system

Answer: B) To allow operators to monitor and control the entire process from a single location

2960. Which of the following protocols is used for communication between field devices and controllers in a DCS?

A) TCP/IP

B) Modbus

C) Profibus

D) Ethernet

Answer: B) Modbus

2961. In DCS, what is a “process variable” (PV)?

A) A setpoint value for control

B) A variable used for alarm generation

C) A measurement that reflects a process condition (e.g., temperature, pressure)

D) A stored data point

Answer: C) A measurement that reflects a process condition (e.g., temperature, pressure)

2962. What is the advantage of using “redundant communication paths” in a DCS?

A) Faster data processing

B) Reduced installation cost

C) Increased system reliability and fault tolerance

D) Improved operator control

Answer: C) Increased system reliability and fault tolerance

2963. In a DCS system, which component is responsible for controlling actuators based on control signals from the controller?

A) Field device

B) I/O module

C) Controller

D) Operator interface

Answer: B) I/O module

2964. What is “decentralized control” in a DCS system?

A) Control functions are distributed across multiple controllers rather than being centralized in one place

B) Control functions are performed only by operators manually

C) Control is only managed by the field devices

D) Control is done based on real-time calculations only

Answer: A) Control functions are distributed across multiple controllers rather than being centralized in one place

2965. Which component in DCS stores historical process data for analysis?

A) Controller

B) Historian

C) Sensor

D) Actuator

Answer: B) Historian

2966. What is the benefit of using a “predictive maintenance” strategy in DCS?

- A) It prevents all equipment failures
- B) It forecasts when maintenance is needed based on equipment conditions, preventing unplanned downtime
- C) It eliminates the need for routine inspections
- D) It increases maintenance costs

Answer: B) It forecasts when maintenance is needed based on equipment conditions, preventing unplanned downtime

2967. In a DCS, which component manages system data and presents it to operators?

- A) I/O module
- B) HMI (Human-Machine Interface)
- C) Controller
- D) Sensor

Answer: B) HMI (Human-Machine Interface)

2968. What is a major challenge when implementing a DCS system in an existing facility?

- A) Lack of network communication protocols
- B) Ensuring compatibility with existing devices and infrastructure
- C) Installing a new backup power supply
- D) Decreasing the processing speed of the system

Answer: B) Ensuring compatibility with existing devices and infrastructure

2969. Which of the following is an essential function of the DCS controller?

- A) To act as a database for process history
- B) To execute control algorithms such as PID
- C) To measure process parameters directly
- D) To store system configuration data

Answer: B) To execute control algorithms such as PID

2970. What is the primary difference between a DCS and a PLC?

- A) DCS is used for discrete control, while PLC is used for continuous processes
- B) DCS is typically used for large, complex processes, while PLC is used for smaller or simpler systems
- C) PLCs do not use digital signals
- D) DCS systems cannot interface with field devices

Answer: B) DCS is typically used for large, complex processes, while PLC is used for smaller or simpler systems

2971. In a DCS system, which component typically provides feedback on the performance of the control loop?

- A) Controller
- B) Sensor
- C) HMI
- D) Actuator

Answer: B) Sensor

2972. What does “fieldbus” refer to in the context of DCS?

- A) A high-speed Ethernet protocol
- B) A communication standard for connecting field devices with the control system
- C) A backup communication system
- D) A control algorithm used in DCS

Answer: B) A communication standard for connecting field devices with the control system

2973. In a DCS, which part of the system is responsible for converting physical measurements into electrical signals?

- A) Sensor
- B) Actuator
- C) Controller

D) I/O module

Answer: A) Sensor

2974. What does “alarm filtering” in a DCS system involve?

A) Ignoring minor alarms that do not require immediate attention

B) Automatically silencing all alarms

C) Reducing the occurrence of alarms by adjusting control parameters

D) Sending alarms to external systems for further processing

Answer: A) Ignoring minor alarms that do not require immediate attention

2975. What is the role of a "setpoint" in a DCS control system?

A) It is the desired value for a process variable that the controller attempts to maintain

B) It is the threshold value that triggers alarms

C) It is the maximum allowable value for process variables

D) It is the physical output signal to the actuator

Answer: A) It is the desired value for a process variable that the controller attempts to maintain

2976. In DCS, what type of signal is typically used for controlling analog devices such as valves and pumps?

A) Digital signal

B) Pulse signal

C) Analog signal (e.g., 4-20mA)

D) Radio frequency signal

Answer: C) Analog signal (e.g., 4-20mA)

c) CNC's

2977. What does CNC stand for?

A. Computer Numeric Calculation

B. Control Numeric Code

C. Computer Numerical Control

D. Command Number Code

Answer: C. Computer Numerical Control

2978. Which component of a CNC machine interprets the program code?

- A. Spindle
- B. Controller
- C. Chuck
- D. Tailstock

Answer: B. Controller

2979. G-codes in CNC programming are used for:

- A. Tool speed
- B. Movement and positioning
- C. Coolant control
- D. Lubrication control

Answer: B. Movement and positioning

2980. M-codes are used in CNC programming to:

- A. Control motion
- B. Set coordinates
- C. Control machine functions like coolant, spindle on/off
- D. Define geometry

Answer: C. Control machine functions like coolant, spindle on/off

2981. The axis perpendicular to both X and Y in CNC milling is:

- A. Z-axis
- B. W-axis
- C. B-axis
- D. A-axis

Answer: A. Z-axis

2982. The CNC machine that operates on turning operation is:

- A. CNC lathe
- B. CNC mill
- C. CNC grinder
- D. CNC router

Answer: A. CNC lathe

2983. What type of motor is most commonly used in CNC machines for precise movement?

- A. DC shunt motor
- B. Stepper motor
- C. Universal motor
- D. Series motor

Answer: B. Stepper motor

2984. Which coordinate system is commonly used in CNC programming?

- A. Polar
- B. Cartesian
- C. Cylindrical
- D. Spherical

Answer: B. Cartesian

2985. G00 command is used for:

- A. Linear cutting
- B. Rapid positioning
- C. Circular interpolation
- D. Thread cutting

Answer: B. Rapid positioning

2986. G01 command is used for:

- A. Rapid traverse
- B. Circular motion
- C. Linear interpolation
- D. Tool change

Answer: C. Linear interpolation

2987. M03 in CNC programming indicates:

- A. Spindle stop
- B. Spindle forward (clockwise)
- C. Spindle reverse
- D. Coolant off

Answer: B. Spindle forward (clockwise)

2988. G02 is used to perform:

- A. Linear motion
- B. Circular interpolation clockwise
- C. Circular interpolation counter-clockwise
- D. Thread cutting

Answer: B. Circular interpolation clockwise

2989. Which of the following is a benefit of CNC machining?

- A. Manual intervention required
- B. High labor cost
- C. Consistency in production
- D. Low accuracy

Answer: C. Consistency in production

2990. Which device provides feedback for position in a CNC machine?

- A. Encoder
- B. Relay

- C. Switch
- D. Solenoid

Answer: A. Encoder

2991. Which of these is a tool holding device in CNC machines?

- A. Chuck
- B. Tailstock
- C. Tool turret
- D. All of the above

Answer: D. All of the above

2992. Which material is commonly used for CNC cutting tools?

- A. Mild steel
- B. High-speed steel
- C. Plastic
- D. Brass

Answer: B. High-speed steel

2993. CNC machines can operate in:

- A. Manual mode only
- B. Semi-automatic mode
- C. Automatic mode
- D. Both B and C

Answer: D. Both B and C

2994. What does a post-processor do in CNC machining?

- A. Generates 3D models
- B. Converts CAD/CAM output to machine-readable code
- C. Controls cutting speed
- D. Moves the tool

Answer: B. Converts CAD/CAM output to machine-readable code

2995. Which of the following is not a CNC axis?

- A. X
- B. Y
- C. Z
- D. Q

Answer: D. Q

2996. The spindle speed in CNC is controlled by:

- A. G-codes
- B. M-codes
- C. S-codes
- D. T-codes

Answer: C. S-codes

2997. What is backlash in CNC machines?

- A. Tool breakage
- B. Delay in spindle speed
- C. Lost motion due to clearance
- D. Extra cutting force

Answer: C. Lost motion due to clearance

2998. Which system is responsible for movement control in CNC?

- A. Hydraulic system
- B. Lubrication system
- C. Drive system
- D. Filtration system

Answer: C. Drive system

2999. CNC turning centers are mainly used for:

- A. Drilling
- B. Milling
- C. Grinding
- D. Cylindrical parts

Answer: D. Cylindrical parts

3000. In a CNC lathe, the tool moves in:

- A. X and Y directions
- B. X and Z directions
- C. Y and Z directions
- D. All 3 directions

Answer: B. X and Z directions

3001. Tool wear in CNC can be detected using:

- A. Ultrasonic sensors
- B. Tool wear monitoring system
- C. Manual observation
- D. Power meter

Answer: B. Tool wear monitoring system

3002. What is D-code used for in CNC?

- A. Defines spindle direction
- B. Defines tool diameter offset
- C. Defines tool number
- D. Defines feed rate

Answer: B. Defines tool diameter offset

3003. What is F-code in CNC?

- A. Feed rate
- B. Spindle speed
- C. Tool number

D. Coolant ON

Answer: A. Feed rate

3004. CNC routers are commonly used to cut:

A. Wood and plastic

B. Concrete

C. Copper pipes

D. Ceramics

Answer: A. Wood and plastic

3005. What type of software is used to design parts in CNC?

A. Excel

B. Photoshop

C. CAD

D. PDF

Answer: C. CAD

3006. In CNC machines, interpolation refers to:

A. Cutting hard materials

B. Calculating tool life

C. Generating movement paths

D. Welding operations

Answer: C. Generating movement paths

3007. Tool length offset is defined using which code?

A. D

B. T

C. H

D. M

Answer: C. H

3008. Which one is a closed-loop control system in CNC?

A. Manual lathe

B. Open-loop stepper motor system

C. Servo motor with encoder feedback

D. Hydraulic press

Answer: C. Servo motor with encoder feedback

3009. The term “part program” in CNC refers to:

A. Maintenance log

B. Tool design

C. Machining instructions

D. Work schedule

Answer: C. Machining instructions

3010. What is the main advantage of DNC over CNC?

- A. Manual control
- B. Centralized program management
- C. Low speed
- D. High noise

Answer: B. Centralized program management

3011. In CNC programming, T-code is used to:

- A. Control tool movement
- B. Select tool number
- C. Adjust temperature
- D. Turn coolant ON

Answer: B. Select tool number

3012. Which G-code cancels the tool length offset?

- A. G41
- B. G40
- C. G49
- D. G50

Answer: C. G49

3013. What is the function of a turret in a CNC lathe?

- A. Holding the chuck
- B. Holding and indexing multiple tools
- C. Cooling the part
- D. Holding the spindle

Answer: B. Holding and indexing multiple tools

3014. Which code represents counter-clockwise circular interpolation?

- A. G02
- B. G03
- C. G04
- D. G05

Answer: B. G03

3015. What does G04 command do in CNC?

- A. Pause/dwell
- B. Cancel motion
- C. Coolant on
- D. Emergency stop

Answer: A. Pause/dwell

3016. What is the primary function of the CNC controller?

- A. Material handling
- B. Cutting the job
- C. Interpreting code and controlling machine motion

D. Heat treatment

Answer: C. Interpreting code and controlling machine motion

3017. CNC machines are ideal for:

- A. Low volume production
- B. Manual machining
- C. High precision and mass production
- D. Only plastic jobs

Answer: C. High precision and mass production

3018. A CNC part program must always start with:

- A. M00
- B. G00
- C. %
- D. G90

Answer: C. %

3019. Which axis controls the vertical motion in CNC milling?

- A. X-axis
- B. Y-axis
- C. Z-axis
- D. A-axis

Answer: C. Z-axis

3020. In CNC systems, backlash compensation is needed to:

- A. Increase feed rate
- B. Prevent vibration
- C. Eliminate lost motion
- D. Enhance coolant pressure

Answer: C. Eliminate lost motion

3021. The main spindle in CNC is driven by a:

- A. Relay
- B. Hydraulic pump
- C. Servo or variable frequency drive
- D. Pneumatic cylinder

Answer: C. Servo or variable frequency drive

3022. Which of these is a feature of CNC machining centers?

- A. Manual clamping
- B. Multi-axis control
- C. No repeatability
- D. Low accuracy

Answer: B. Multi-axis control

3023. What is the purpose of a ball screw in CNC machines?

- A. Cutting metal
- B. Transmitting motion with minimal friction
- C. Holding coolant
- D. Adjusting temperature

Answer: B. Transmitting motion with minimal friction

3024. In CNC terminology, 'tool wear offset' is:

- A. A replacement tool
- B. Adjustment for tool length changes due to wear
- C. Axis offset
- D. None of the above

Answer: B. Adjustment for tool length changes due to wear

3025. Which axis represents rotational motion around X-axis?

- A. A-axis
- B. B-axis
- C. C-axis
- D. Z-axis

Answer: A. A-axis

3026. Which code is used to start coolant in CNC?

- A. M07/M08
- B. M03
- C. G01
- D. S1000

Answer: A. M07/M08

3027. Which code is used for tool change in CNC?

- A. T-code
- B. G90
- C. M06
- D. H-code

Answer: C. M06

3028. Which of the following is used for graphical simulation of CNC programs?

- A. Compiler
- B. Emulator
- C. CAM software
- D. PLC

Answer: C. CAM software

3029. Which command is used to stop a CNC program?

- A. G00
- B. M30
- C. G28

D. M08

Answer: B. M30

3030. Which code is used to turn OFF spindle in CNC?

A. M03

B. M05

C. M09

D. M06

Answer: B. M05

3031. What does G90 represent in CNC programming?

A. Incremental positioning

B. Dwell time

C. Absolute positioning

D. Feed rate control

Answer: C. Absolute positioning

3032. Which of these is not a CNC machine type?

A. CNC milling machine

B. CNC lathe

C. CNC welder

D. CNC grinder

Answer: C. CNC welder

3033. In CNC, incremental positioning is done using:

A. G90

B. G91

C. M03

D. G00

Answer: B. G91

3034. Which code returns machine to home position?

A. G28

B. M30

C. G00

D. T0

Answer: A. G28

3035. The rotational axis in a 5-axis CNC is:

A. Only X, Y

B. A, B, or C

C. X, Y, Z

D. G and M

Answer: B. A, B, or C

3036. G-code is generally written in which format?

- A. XML
- B. ASCII
- C. Binary
- D. HTML

Answer: B. ASCII

3037. The workpiece in CNC is usually clamped on:

- A. Tool holder
- B. Spindle nose
- C. Machine bed or table
- D. Tailstock

Answer: C. Machine bed or table

3038. Which of the following affects surface finish in CNC machining?

- A. Spindle speed
- B. Feed rate
- C. Tool sharpness
- D. All of the above

Answer: D. All of the above

3039. A CNC operator is responsible for:

- A. Writing source code
- B. Supervising manual machines
- C. Loading parts and tools, running programs
- D. Quality inspection only

Answer: C. Loading parts and tools, running programs

3040. In CNC, dry run is used to:

- A. Cut at maximum speed
- B. Test the program without cutting
- C. Lubricate machine
- D. Remove swarf

Answer: B. Test the program without cutting

3041. The function of a tool presetting system in CNC is:

- A. Cooling
- B. Measuring tool length and diameter before loading
- C. Holding tools
- D. Storing G-codes

Answer: B. Measuring tool length and diameter before loading

3042. Which of the following is a safety feature commonly integrated in CNC machines?

- A. Emergency stop button
- B. Spindle lock
- C. Backup power

D. Servo brake

Answer: A. Emergency stop button

3043. Which G-code is used for tapping operations in CNC?

A. G81

B. G84

C. G73

D. G83

Answer: B. G84

3044. A CNC machine works on which type of coordinate system?

A. Binary system

B. Cartesian coordinate system

C. Polar coordinate system only

D. Spherical coordinate system

Answer: B. Cartesian coordinate system

3045. What does the T-code in CNC programming refer to?

A. Tool change

B. Tool path

C. Torque control

D. Table movement

Answer: A. Tool change

3046. What is the use of G94 in CNC?

A. Feed per revolution

B. Feed per minute

C. Cancel cutter compensation

D. Return to home

Answer: B. Feed per minute

3047. What does the term “interpolation” refer to in CNC programming?

A. Switching tools

B. Power management

C. Controlling coolant

D. Path computation between two points

Answer: D. Path computation between two points

3048. A machine operating on 5-axis CNC can move:

A. In X, Y, Z directions only

B. In X, Y, Z + A & B rotational axes

C. Only in a single plane

D. Just linear motion

Answer: B. In X, Y, Z + A & B rotational axes

3049. What is the function of M08 in CNC?

- A. Start coolant
- B. Start spindle
- C. Stop coolant
- D. Program end

Answer: A. Start coolant

3050. Which of the following is a high-level CNC language?

- A. APT (Automatically Programmed Tool)
- B. Python
- C. Java
- D. G-Code

Answer: A. APT

3051. Which CNC axis is generally used for angular rotation of the worktable?

- A. B-axis
- B. C-axis
- C. X-axis
- D. Z-axis

Answer: B. C-axis

3052. What is the benefit of canned cycles like G81 or G83 in CNC programming?

- A. Fast drilling operations with fewer codes
- B. Increases spindle power
- C. Allows manual tool change
- D. Improves lubrication

Answer: A. Fast drilling operations with fewer codes

3053. A backlash in CNC leads to:

- A. Increased accuracy
- B. Reduced friction
- C. Positioning error
- D. Longer tool life

Answer: C. Positioning error

3054. The resolution of a CNC machine refers to:

- A. Tool diameter
- B. Minimum incremental movement possible
- C. Maximum tool length
- D. Surface roughness

Answer: B. Minimum incremental movement possible

3055. DNC stands for:

- A. Direct Numerical Control
- B. Digital Numerical Compiler
- C. Differential Network Control

D. Dynamic Node Control

Answer: A. Direct Numerical Control

3056. The M-code M00 means:

- A. Emergency stop
- B. Program stop (optional)
- C. Program stop (mandatory)
- D. Spindle stop

Answer: C. Program stop (mandatory)

3057. Which of the following commands is used for peck drilling?

- A. G80
- B. G83
- C. G85
- D. G95

Answer: B. G83

3058. Which of these components ensures precise tool movement in CNC machines?

- A. Chain drive
- B. Rack and pinion
- C. Ball screw and servo motor
- D. Pulley and belt

Answer: C. Ball screw and servo motor

3059. Which of these is a major advantage of CNC over conventional machines?

- A. High manual involvement
- B. Higher material waste
- C. Consistency in part quality
- D. Slower operations

Answer: C. Consistency in part quality

3060. In CNC, a servo motor is mainly used for:

- A. Holding workpiece
- B. Moving axis with feedback
- C. Driving coolant pump
- D. Tool sharpening

Answer: B. Moving axis with feedback

3061. What does "feed rate" control in CNC machining?

- A. Spindle speed
- B. Rate of tool movement
- C. Tool sharpness
- D. Tool diameter

Answer: B. Rate of tool movement

3062. The G-code for linear interpolation is:

- A. G01
- B. G02
- C. G03
- D. G04

Answer: A. G01

3063. G-code and M-code in CNC programming stand for:

- A. Gear and Motor codes
- B. General and Manual codes
- C. Geometric and Machine codes
- D. None of the above

Answer: C. Geometric and Machine codes

3064. The M-code M06 is related to:

- A. Spindle rotation
- B. Tool change
- C. Coolant ON
- D. Feed override

Answer: B. Tool change

3065. CNC turning operations are typically done on:

- A. CNC milling machine
- B. CNC lathe
- C. CNC EDM
- D. CNC grinder

Answer: B. CNC lathe

3066. Which is a part of the CNC machine tool structure?

- A. Control Panel
- B. Cooling System
- C. Spindle
- D. All of the above

Answer: D. All of the above

3067. What is the main role of a CAM system in CNC?

- A. Operate machine manually
- B. Edit CAD files
- C. Convert CAD to toolpath
- D. Increase RPM

Answer: C. Convert CAD to toolpath

3068. Which software is typically used to create toolpaths for CNC?

- A. CAM
- B. Word
- C. Excel

D. Paint

Answer: A. CAM

3069. Which device reads the feedback from axis movement in CNC?

A. Actuator

B. Resolver

C. Encoder

D. Relay

Answer: C. Encoder

3070. A “loop” in a CNC program is used for:

A. Repeating a sequence

B. Increasing spindle speed

C. Changing tools

D. Positioning work

Answer: A. Repeating a sequence

3071. The zero return position is also called:

A. Origin

B. Tool offset

C. Program end

D. Finish pass

Answer: A. Origin

3072. What is a “soft limit” in CNC machines?

A. Physical machine boundary

B. Programmable limit in controller

C. Electrical fault

D. Machine stop due to overload

Answer: B. Programmable limit in controller

3073. The code “S” in CNC represents:

A. Spindle speed

B. Servo on

C. Slideway

D. Surface finish

Answer: A. Spindle speed

3074. What is nesting in CNC machining?

A. Tool presetting

B. Part optimization in sheet

C. Tool indexing

D. Feed rate reduction

Answer: B. Part optimization in sheet

3075. A fixture in CNC is used to:

- A. Cool the part
- B. Change tool
- C. Hold the workpiece
- D. Increase tool life

Answer: C. Hold the workpiece

3076. Which of the following is NOT part of a CNC system?

- A. CAD software
- B. CAM software
- C. PLC hardware
- D. WPS software

Answer: D. WPS software

d) Thyristor Controls

3077. A thyristor can be turned on by:

- A) Increasing supply voltage
- B) Decreasing supply voltage
- C) Applying a gate pulse
- D) Opening the anode circuit

Correct: C

3078. Once turned on, an SCR remains conducting until:

- A) Gate signal is removed
- B) Anode current falls below holding current
- C) Anode voltage increases
- D) Gate voltage reaches zero

Correct: B

3079. Which of the following is a three-terminal device?

- A) Diode
- B) SCR
- C) MOSFET
- D) Triac

Correct: B

3080. Holding current is defined as:

- A) Minimum gate current to turn on the thyristor
- B) Maximum gate current
- C) Minimum anode current to keep SCR conducting
- D) Peak reverse current

Correct: C

3081. Latching current in SCR is:

- A) Always equal to holding current
- B) Less than holding current

- C) Greater than holding current
- D) Equal to peak current

Correct: C

3082. Gate triggering current is generally:

- A) AC current
- B) High-frequency current
- C) Low-magnitude DC current
- D) Very high-magnitude current

Correct: C

3083. The forward blocking mode of SCR occurs when:

- A) Anode is negative w.r.t cathode
- B) Gate current is zero
- C) Anode is positive w.r.t cathode but no gate signal is applied
- D) Gate current is high

Correct: C

3084. The typical on-state voltage drop across an SCR is:

- A) 0.1V
- B) 1V to 2V
- C) 10V
- D) 5V

Correct: B

3085. Which one of the following determines the maximum current rating of an SCR?

- A) Gate current
- B) Forward breakover voltage
- C) Thermal resistance
- D) Peak reverse voltage

Correct: C

3086. Which is not a method of triggering an SCR?

- A) Thermal triggering
- B) Light triggering
- C) Gate triggering
- D) Magnetic triggering

Correct: D

3087. Natural commutation occurs in:

- A) DC circuits
- B) AC circuits
- C) Choppers
- D) Inverters

Correct: B

3088. In class-F commutation:

- A) External capacitor is used
- B) Line voltage assists commutation

- C) Gate current is reversed
- D) RC network is used

Correct: B

3089. Which method of commutation is used in HVDC transmission?

- A) Natural commutation
- B) Forced commutation
- C) Line commutation
- D) Voltage commutation

Correct: B

3090. Turn-off time of a thyristor is defined as:

- A) Time required to switch ON
- B) Time between gate signal and conduction
- C) Time taken to regain forward blocking state
- D) Time to build up reverse voltage

Correct: C

3091. A full-wave rectifier using thyristors is also known as:

- A) Uncontrolled rectifier
- B) Controlled bridge rectifier
- C) Half converter
- D) Chopper

Correct: B

3092. In a half-wave controlled rectifier, the output depends on:

- A) Load impedance
- B) Firing angle
- C) Supply frequency
- D) Reverse recovery time

Correct: B

3093. In a single-phase full converter, how many SCRs are used?

- A) 1
- B) 2
- C) 4
- D) 6

Correct: C

3094. In a full converter, if firing angle $\alpha = 90^\circ$, the average output voltage is:

- A) Zero
- B) Maximum
- C) Negative
- D) Infinity

Correct: A

3095. The main disadvantage of using thyristors in power circuits is:

- A) High efficiency
- B) Unidirectional conduction

- C) High-speed switching
- D) Compact size

Correct: B

3096. Snubber circuits are used to protect SCRs from:

- A) High temperature
- B) High gate current
- C) High dv/dt
- D) High power factor

Correct: C

3097. A typical snubber circuit includes:

- A) Diode only
- B) Resistor and inductor
- C) Resistor and capacitor
- D) Capacitor and diode

Correct: C

3098. The function of a freewheeling diode is to:

- A) Reduce voltage
- B) Allow negative cycle
- C) Provide a path for inductive load current
- D) Protect gate terminal

Correct: C

3099. SCRs are protected from overcurrent using:

- A) RC snubber
- B) Series fuse
- C) Zener diode
- D) Filter capacitor

Correct: B

3100. Which of the following faults is a thyristor most sensitive to?

- A) Low-frequency noise
- B) dv/dt and overcurrent
- C) High-frequency switching
- D) Gate leakage

Correct: B

3101. Choppers convert:

- A) AC to DC
- B) DC to AC
- C) Fixed DC to variable DC
- D) DC to constant voltage

Correct: C

3102. In voltage commutated chopper, turn-off is achieved by:

- A) Interrupting gate current
- B) Applying a reverse voltage

- C) Using zero crossing
- D) None of the above

Correct: B

3103. An inverter is a circuit that converts:

- A) DC to AC
- B) AC to DC
- C) AC to AC
- D) DC to DC

Correct: A

3104. Which type of thyristor is used in high-frequency inverter circuits?

- A) SCR
- B) TRIAC
- C) GTO
- D) DIAC

Correct: C

3105. The main challenge in thyristor-based inverters is:

- A) Size
- B) Weight
- C) Commutation
- D) Input voltage

Correct: C

3106. Thyristors are primarily used in:

- A) Signal processing
- B) Power control
- C) Data storage
- D) Communication circuits

Correct: B

3107. A TRIAC is a:

- A) Bidirectional SCR
- B) Unidirectional diode
- C) Type of transistor
- D) DC chopper

Correct: A

3108. The gate terminal of SCR is used to:

- A) Block current
- B) Cool the device
- C) Initiate conduction
- D) Measure voltage

Correct: C

3109. Reverse blocking mode of SCR is when:

- A) Gate current is applied
- B) Anode is negative w.r.t cathode

- C) SCR is turned on
- D) Anode is positive w.r.t cathode

Correct: B

3110. Which component can turn off a thyristor without external commutation?

- A) TRIAC
- B) GTO
- C) DIAC
- D) SCR

Correct: B

3111. dv/dt protection prevents:

- A) False turn-off
- B) False turn-on
- C) Excessive power loss
- D) Gate noise

Correct: B

3112. Which device is not suitable for bidirectional control?

- A) TRIAC
- B) DIAC
- C) SCR
- D) MOSFET

Correct: C

3113. The forward breakover voltage is the voltage at which:

- A) SCR turns off
- B) SCR conducts without gate signal
- C) Gate resistance burns out
- D) Reverse leakage increases

Correct: B

3114. In thyristor terminology, "GTO" stands for:

- A) Gate-Turn-Off
- B) Gate-Time-On
- C) General Turn-Off
- D) Gate-Triggered Oscillator

Correct: A

3115. Which device helps in turning ON the TRIAC?

- A) MOSFET
- B) DIAC
- C) IGBT
- D) BJT

Correct: B

3116. The holding current of an SCR is:

- A) The current needed to turn it on
- B) The minimum current to keep it on after firing

- C) The maximum current it can handle
- D) The gate current required to trigger

Correct: B

3117. Which of the following is a two-terminal bidirectional device?

- A) SCR
- B) DIAC
- C) TRIAC
- D) GTO

Correct: B

3118. The main function of a commutation circuit is to:

- A) Trigger the SCR
- B) Turn off the SCR
- C) Protect the SCR from voltage spikes
- D) Amplify the output signal

Correct: B

3119. Which parameter limits the rate of rise of anode current?

- A) dv/dt
- B) di/dt
- C) Holding current
- D) Latching current

Correct: B

3120. In a phase-controlled rectifier, power control is done by:

- A) Varying frequency
- B) Varying firing angle
- C) Changing load resistance
- D) Changing supply voltage

Correct: B

3121. A DIAC is mainly used as a:

- A) Trigger device for TRIAC
- B) High power rectifier
- C) Voltage regulator
- D) Frequency modulator

Correct: A

3122. Which of the following devices has four layers of P and N type material?

- A) Diode
- B) BJT
- C) SCR
- D) MOSFET

Correct: C

3123. What is the typical turn-on time of an SCR?

- A) A few microseconds
- B) A few milliseconds

- C) A few seconds
- D) Several nanoseconds

Correct: A

3124. A GTO thyristor is different from an SCR in that it can be:

- A) Turned on by gate current
- B) Turned off by gate current
- C) Triggered by light
- D) Triggered by heat

Correct: B

3125. Which device can conduct current in both directions when triggered?

- A) SCR
- B) TRIAC
- C) GTO
- D) Diode

Correct: B

3126. The thyristor turns on when:

- A) Gate current is zero
- B) Anode voltage is negative
- C) Gate pulse is applied and anode is positive
- D) Cathode is more positive than anode

Correct: C

3127. Thyristor acts as a:

- A) Voltage controlled switch
- B) Current controlled switch
- C) Gate controlled rectifier
- D) Light controlled amplifier

Correct: C

3128. In a thyristor, when gate current is increased:

- A) Turn-on time decreases
- B) Turn-on time increases
- C) Holding current increases
- D) Breakover voltage increases

Correct: A

3129. The gate of SCR is always connected to:

- A) Cathode
- B) Anode
- C) Positive terminal
- D) Negative terminal

Correct: A

3130. Which of these is a bidirectional device?

- A) SCR
- B) TRIAC

C) GTO

D) UJT

Correct: B

3131. The reverse recovery time of a thyristor is the time it takes to:

A) Turn on

B) Turn off

C) Recover from short-circuit

D) Restore blocking state

Correct: B

3132. TRIAC can conduct in:

A) Only positive half cycle

B) Only negative half cycle

C) Both positive and negative half cycles

D) Forward blocking mode

Correct: C

3133. SCR is made of how many layers of semiconductor material?

A) 2

B) 3

C) 4

D) 5

Correct: C

3134. The DIAC is used primarily to:

A) Trigger a TRIAC

B) Filter DC supply

C) Rectify AC

D) Reduce frequency

Correct: A

3135. The device which can be turned ON and OFF using gate signals is:

A) SCR

B) TRIAC

C) GTO

D) DIAC

Correct: C

3136. A thyristor is turned off by:

A) Applying gate pulse

B) Reversing supply

C) Reducing anode current below holding current

D) Increasing gate voltage

Correct: C

3137. Thyristors are mainly used in:

A) Audio amplifiers

B) Low power circuits

- C) Digital memory
- D) Power electronics

Correct: D

3138. In an SCR, forward breakover voltage is the minimum voltage at which:

- A) It turns off
- B) It conducts without gate signal
- C) It reverses polarity
- D) Gate burns out

Correct: B

3139. Which of the following is used to commutate a thyristor in a chopper circuit?

- A) Resistor
- B) Capacitor
- C) Inductor
- D) Diode

Correct: B

3140. Class D commutation is also known as:

- A) Load commutation
- B) Resonant commutation
- C) Auxiliary commutation
- D) Voltage commutation

Correct: C

3141. In Class A commutation, the commutation is achieved by:

- A) AC supply
- B) External supply
- C) Load current itself
- D) Gate signal

Correct: C

3142. In a TRIAC, conduction is controlled in:

- A) One direction
- B) Both directions
- C) Only during positive cycle
- D) Only during negative cycle

Correct: B

3143. For turning off a conducting TRIAC, we need to:

- A) Reduce voltage
- B) Apply gate current
- C) Reduce current below holding current
- D) Reverse the gate polarity

Correct: C

3144. In an SCR, reverse recovery time is important for:

- A) Commutation
- B) Triggering

- C) Holding
- D) Latching

Correct: A

3145. The static dv/dt rating of SCR indicates its:

- A) Thermal stability
- B) Latching current
- C) Susceptibility to false triggering
- D) Gate triggering sensitivity

Correct: C

3146. Which is the correct order of SCR terminals (left to right)?

- A) Gate, Anode, Cathode
- B) Anode, Cathode, Gate
- C) Cathode, Gate, Anode
- D) Anode, Gate, Cathode

Correct: D

3147. Which device is most commonly used for AC voltage control in fan regulators?

- A) SCR
- B) MOSFET
- C) TRIAC
- D) BJT

Correct: C

3148. TRIACs are suitable for:

- A) DC-only loads
- B) AC-only loads
- C) High-frequency loads
- D) Battery chargers

Correct: B

3149. SCRs are preferred in power control because of:

- A) High switching speed
- B) High gain
- C) High efficiency
- D) High frequency

Correct: C

3150. Which of the following devices is used for triggering TRIACs in phase control circuits?

- A) Zener diode
- B) UJT
- C) DIAC
- D) LED

Correct: C

3151. UJT is used in thyristor circuits mainly for:

- A) Amplification

- B) Protection
- C) Triggering
- D) Commutation

Correct: C

3152. Which of the following thyristors can be turned off using a gate signal?

- A) TRIAC
- B) DIAC
- C) GTO
- D) SCR

Correct: C

3153. What happens if dv/dt across a thyristor exceeds its rating?

- A) Thyristor turns off
- B) Thyristor turns on unintentionally
- C) Device fails instantly
- D) Device operates normally

Correct: B

3154. The main function of a heat sink in thyristor circuits is to:

- A) Reduce conduction losses
- B) Control gate signal
- C) Dissipate heat
- D) Limit voltage

Correct: C

3155. Gate characteristics of SCR relate gate current with:

- A) Anode voltage
- B) Cathode voltage
- C) Gate voltage
- D) Anode current

Correct: C

3156. TRIACs are triggered by:

- A) Gate current only in positive cycle
- B) Voltage across main terminals
- C) Gate current in either polarity
- D) Reverse voltage

Correct: C

3157. Which triggering method uses a pulse transformer?

- A) Capacitive triggering
- B) Optical triggering
- C) Pulse triggering
- D) DC triggering

Correct: C

3158. During reverse blocking mode, SCR behaves like a:

- A) Short circuit

- B) Open circuit
- C) Diode
- D) Zener

Correct: B

3159. What controls the output of a phase-controlled rectifier?

- A) Load resistance
- B) Firing angle
- C) Output current
- D) Input frequency

Correct: B

3160. The turn-on time of an SCR depends on:

- A) Gate width
- B) Gate power
- C) Gate current
- D) All of the above

Correct: D

3161. Thyristor protection circuits include:

- A) Filters
- B) RC snubber
- C) EMI suppressor
- D) Rectifiers

Correct: B

3162. An SCR conducts when:

- A) Gate is positive and anode is positive
- B) Gate is negative
- C) Anode is negative
- D) Gate is open

Correct: A

3163. The SCR characteristic curve is plotted between:

- A) Voltage and frequency
- B) Current and voltage
- C) Gate voltage and resistance
- D) Current and power

Correct: B

3164. Which device can control AC power in both directions?

- A) SCR
- B) GTO
- C) TRIAC
- D) BJT

Correct: C

3165. The gate power loss in SCRs is typically:

- A) High

- B) Negligible
- C) Medium
- D) Depends on load

Correct: B

3166. In SCR, breakover voltage is highest when:

- A) Gate is shorted
- B) Gate is open
- C) Load is resistive
- D) Gate current is maximum

Correct: B

3167. Commutation means:

- A) Applying forward voltage
- B) Increasing gate pulse
- C) Turning off the thyristor
- D) Providing snubber

Correct: C

3168. The holding current is always:

- A) Higher than latching current
- B) Equal to latching current
- C) Lower than latching current
- D) Irrelevant in SCRs

Correct: C

3169. The main function of the gate in SCR is to:

- A) Switch off device
- B) Trigger device
- C) Control voltage
- D) Reduce current

Correct: B

3170. The load current in a controlled rectifier depends on:

- A) Anode voltage only
- B) Supply frequency
- C) Load impedance and firing angle
- D) Commutation method

Correct: C

3171. A high-frequency thyristor trigger circuit often uses:

- A) Relay
- B) Pulse transformer
- C) Inductor
- D) Thermistor

Correct: B

3172. Thyristor can be triggered by:

- A) Gate voltage

- B) Heat
- C) Light
- D) All of the above

Correct: D

3173. For AC voltage control using thyristor, which is most suitable?

- A) Chopper
- B) Inverter
- C) TRIAC
- D) Diode

Correct: C

3174. The value of latching current is typically:

- A) 10x holding current
- B) Equal to gate current
- C) Slightly higher than holding current
- D) Zero

Correct: C

3175. Which of the following is not a type of commutation?

- A) Natural
- B) Forced
- C) Resonant
- D) Synchronous

Correct: D

3176. The number of PN junctions in an SCR is:

- A) 1
- B) 2
- C) 3
- D) 4

Correct: C

3177. A TRIAC can be triggered in:

- A) Only one quadrant
- B) Two quadrants
- C) Three quadrants
- D) All four quadrants

Correct: D

3178. In SCR, latching current is the minimum current required to:

- A) Turn off the device
- B) Keep the device off
- C) Maintain conduction after gate signal is removed
- D) Reverse the current flow

Correct: C

3179. Which device is most suitable for switching high current loads in AC circuits?

- A) BJT

- B) TRIAC
- C) MOSFET
- D) UJT

Correct: B

3180. During the off-state of an SCR, the current flowing is called:

- A) Latching current
- B) Holding current
- C) Leakage current
- D) Triggering current

Correct: C

3181. The turn-off process in a thyristor is also known as:

- A) Triggering
- B) Firing
- C) Commutation
- D) Conduction

Correct: C

3182. Which thyristor family member can be turned off via gate signal?

- A) GTO
- B) TRIAC
- C) SCR
- D) DIAC

Correct: A

3183. A light-triggered thyristor is known as:

- A) LASCR
- B) DIAC
- C) TRIAC
- D) Opto-isolator

Correct: A

3184. Which SCR parameter must be exceeded to cause unintentional turn-on?

- A) Latching current
- B) Holding current
- C) dv/dt
- D) Peak current

Correct: C

3185. TRIACs can be triggered by applying gate current in:

- A) Only one polarity
- B) Positive polarity only
- C) Negative polarity only
- D) Either polarity

Correct: D

3186. Which component is commonly used to suppress high dv/dt in thyristor circuits?

- A) Capacitor

- B) Fuse
- C) Resistor
- D) RC Snubber

Correct: D

3187. Which thyristor has symmetrical V-I characteristics?

- A) SCR
- B) TRIAC
- C) DIAC
- D) GTO

Correct: B

3188. In a TRIAC, MT1 and MT2 refer to:

- A) Gate terminals
- B) Main terminals
- C) Trigger terminals
- D) Transformer taps

Correct: B

3189. The gate current required for triggering is usually:

- A) AC
- B) DC
- C) High-frequency
- D) Reverse-polarity

Correct: B

3190. The breakover voltage of an SCR decreases when:

- A) Gate current increases
- B) Gate current decreases
- C) Anode voltage increases
- D) Anode current increases

Correct: A

3191. The purpose of DIAC in triggering circuit is to:

- A) Block gate current
- B) Limit gate voltage
- C) Provide symmetrical switching
- D) Reduce frequency

Correct: C

3192. TRIAC can be used for:

- A) Only DC circuits
- B) Both AC and DC
- C) Only AC circuits
- D) High-frequency circuits

Correct: C

3193. Which of the following is a unidirectional device?

- A) TRIAC

- B) DIAC
 - C) SCR
 - D) GTO
- Correct: C**

3194. A DIAC conducts when the applied voltage exceeds:

- A) Forward breakover voltage
 - B) Reverse voltage
 - C) Breakover voltage in either direction
 - D) Holding current
- Correct: C**

3195. In a resistive load, current and voltage are:

- A) Out of phase
 - B) In phase
 - C) Opposite in direction
 - D) Zero
- Correct: B**

3196. Which device is best suited for AC light dimmer control?

- A) SCR
 - B) DIAC
 - C) TRIAC
 - D) BJT
- Correct: C**

3197. Triggering angle control in TRIAC circuits is achieved using:

- A) Transformer
 - B) RC Network
 - C) Inductor
 - D) Heat sink
- Correct: B**

3198. Gate triggering circuit using UJT is preferred because:

- A) UJT is cheap
 - B) UJT is a switching device
 - C) UJT provides sharp pulse
 - D) UJT is linear
- Correct: C**

3199. The main terminals of a TRIAC are labeled as:

- A) Emitter and collector
 - B) Source and drain
 - C) MT1 and MT2
 - D) Anode and cathode
- Correct: C**

3200. Which parameter ensures safe operation of SCR under high frequency?

- A) di/dt rating

- B) dv/dt rating
- C) Gate current
- D) Forward voltage

Correct: A

3201. In a single-phase full converter, the average output voltage is zero when firing angle is:

- A) 0°
- B) 90°
- C) 120°
- D) 180°

Correct: B

3202. Which of the following is a natural commutation method?

- A) Class A
- B) Class B
- C) Class C
- D) Class E

Correct: A

3203. In power electronics, SCR is mostly used as a:

- A) Signal amplifier
- B) Current booster
- C) Controlled rectifier
- D) Transistor substitute

Correct: C

3204. Which of the following is not a thyristor family device?

- A) GTO
- B) TRIAC
- C) DIAC
- D) BJT

Correct: D

3205. The average power output of a controlled rectifier increases with:

- A) Increasing load
- B) Increasing firing angle
- C) Decreasing firing angle
- D) Constant frequency

Correct: C

3206. GTO requires what type of gate pulse to turn off?

- A) Positive
- B) AC
- C) Negative
- D) Pulsed DC

Correct: C

3207. In phase angle control of SCR, power is controlled by:

- A) Varying frequency
- B) Varying gate voltage
- C) Varying firing angle
- D) Changing load resistance

Correct: C

3208. Turn-off time in an SCR is measured in:

- A) Seconds
- B) Milliseconds
- C) Microseconds
- D) Nanoseconds

Correct: C

3209. Thyristor ratings are usually given for:

- A) DC only
- B) AC only
- C) Both AC and DC
- D) Variable frequency

Correct: C

3210. In a full converter, the output voltage is negative when firing angle is:

- A) $>90^\circ$
- B) $=90^\circ$
- C) $<90^\circ$
- D) $=0^\circ$

Correct: A

3211. dv/dt effect can be minimized using:

- A) Heat sink
- B) RC snubber
- C) Inductor
- D) Pulse transformer

Correct: B

3212. Class B commutation is also called:

- A) Voltage commutation
- B) Current commutation
- C) Load commutation
- D) Resonant commutation

Correct: A

3213. TRIAC replaces:

- A) Two SCRs in antiparallel
- B) One BJT
- C) Two BJTs
- D) One MOSFET

Correct: A

3214. Which device is turned on by gate current and turned off by load current?

- A) SCR
- B) TRIAC
- C) GTO
- D) DIAC

Correct: A

3215. To isolate control and power circuits, which device is used?

- A) GTO
- B) UJT
- C) Opto-coupler
- D) TRIAC

Correct: C

3216. In Class C commutation, the commutation is achieved using:

- A) Load
- B) Capacitor and SCR
- C) Transformer
- D) Freewheeling diode

Correct: B

3217. Which device can be used for zero-crossing detection in SCR firing?

- A) UJT
- B) DIAC
- C) Opto-isolator
- D) Zero-crossing detector

Correct: D

3218. The conduction angle in a controlled rectifier is:

- A) 360°
- B) 180°
- C) $(180^\circ - \alpha)$
- D) $(180^\circ + \alpha)$

Correct: C

3219. In dual converters, the control technique used is:

- A) Voltage commutation
- B) Complementary firing
- C) Series resonance
- D) Zero-voltage switching

Correct: B

3220. A GTO can be used in:

- A) Low power AC drives
- B) High power DC drives
- C) Communication systems
- D) Audio amplifiers

Correct: B

3221. In half-wave rectifier using SCR, output frequency is:

- A) Same as input
- B) Double the input
- C) Half the input
- D) Zero

Correct: A

3222. A commutation circuit is used to:

- A) Trigger SCR
- B) Turn off SCR
- C) Protect from overvoltage
- D) Amplify signal

Correct: B

3223. Reverse blocking capability is essential in:

- A) TRIAC
- B) GTO
- C) SCR
- D) DIAC

Correct: C

3224. The junction temperature of a thyristor should be:

- A) As high as possible
- B) Very low
- C) Within rated limits
- D) Equal to room temperature

Correct: C

3225. A thyristor is in forward blocking mode when:

- A) Gate is triggered
- B) Anode is positive, no gate signal
- C) Anode is negative
- D) Holding current flows

3226. In a TRIAC, conduction begins when:

- A) Anode voltage exceeds gate voltage
- B) Gate signal is applied
- C) Main terminal 1 is positive
- D) Capacitor is charged

Correct: B

3227. The latching current of an SCR is typically:

- A) Higher than holding current
- B) Lower than holding current
- C) Equal to holding current
- D) Equal to gate current

Correct: A

3228. Which one is not a turn-off method of SCR?

- A) Forced commutation
- B) Natural commutation
- C) Gate commutation
- D) Line commutation

Correct: C

3229. The turn-on time of an SCR is in the range of:

- A) 1-5 seconds
- B) 1-10 ms
- C) 1-10 μ s
- D) 1-10 ns

Correct: C

3230. What is the function of a snubber circuit?

- A) Amplification
- B) Noise generation
- C) dv/dt protection
- D) Boosting power

Correct: C

3231. The phase control method in thyristors is based on varying the:

- A) Load resistance
- B) Frequency
- C) Firing angle
- D) Supply voltage

Correct: C

3232. Which device is turned off when anode current < holding current?

- A) GTO
- B) TRIAC
- C) SCR
- D) All of the above

Correct: D

3233. Which type of load is most critical for SCR commutation?

- A) Resistive
- B) Capacitive
- C) Inductive
- D) Linear

Correct: C

3234. TRIAC triggering uses a DIAC to:

- A) Delay conduction
- B) Provide pulse shaping
- C) Provide symmetrical triggering
- D) Increase power

Correct: C

3235. In AC circuits, SCR commutation is simpler because of:

- A) Constant voltage
- B) Voltage zero-crossing
- C) Current spikes
- D) High power

Correct: B

3236. GTO is most suitable for:

- A) Small signal amplification
- B) Low power switching
- C) High power, high voltage applications
- D) Oscillator circuits

Correct: C

3237. Thyristor protection circuits are necessary to prevent failure due to:

- A) Overvoltage
- B) Overcurrent
- C) Excessive dv/dt and di/dt
- D) All of the above

Correct: D

3238. Which is used for triggering a high-power SCR?

- A) Capacitor
- B) Transformer
- C) Pulse transformer
- D) DIAC

Correct: C

3239. The forward current rating of a thyristor refers to:

- A) Peak gate current
- B) Peak anode current
- C) Maximum safe operating current
- D) Reverse leakage current

Correct: C

3240. Which of these is not part of an SCR structure?

- A) P-layer
- B) N-layer
- C) Gate junction
- D) Collector

Correct: D

3241. SCR commutation is the process of:

- A) Latching the device
- B) Triggering it
- C) Turning it off
- D) Turning it on

Correct: C

3242. Which thyristor is most suitable for high-speed switching?

- A) TRIAC
- B) LASCR
- C) GTO
- D) SCR

Correct: C

3243. A dual converter consists of:

- A) Two TRIACs
- B) Two GTOs
- C) Two full converters in anti-parallel
- D) A full and half converter

Correct: C

3244. Which is used to sense zero-crossing for firing SCRs?

- A) RC snubber
- B) Opto-isolator
- C) Zero crossing detector
- D) Diode bridge

Correct: C

3245. A freewheeling diode is used in:

- A) Capacitive load
- B) Pure resistive load
- C) Inductive load
- D) Constant power load

Correct: C

3246. In forced commutation, thyristor is turned off by:

- A) Reducing gate current
- B) Forcing reverse current
- C) Triggering DIAC
- D) Reducing voltage

Correct: B

3247. Which of the following is a disadvantage of SCRs?

- A) High speed
- B) Inability to turn off by gate
- C) Bidirectional conduction
- D) High efficiency

Correct: B

3248. The most important characteristic of a power thyristor is:

- A) Low gain
- B) Triggering time
- C) High power handling
- D) Small size

Correct: C

3249. Which is the most common method to trigger an SCR?

- A) Light triggering
- B) dv/dt triggering
- C) Gate triggering
- D) Voltage triggering

Correct: C

3250. LASCR is a thyristor that is:

- A) Gate-controlled
- B) Light-activated
- C) Logic-controlled
- D) Line-commutated

Correct: B

3251. The gate current required for firing an SCR is typically in the range of:

- A) Nanoamperes
- B) Microamperes
- C) Milliamperes
- D) Amperes

Correct: C

3252. Which thyristor-based device is commonly used in power control of domestic appliances?

- A) DIAC
- B) TRIAC
- C) GTO
- D) LASCR

Correct: B

3253. Gate triggering is not required in SCR if:

- A) It is used in a chopper
- B) Forward breakover voltage is exceeded
- C) Load is capacitive
- D) dv/dt is high

Correct: B

3254. SCRs used in AC voltage regulators control:

- A) RMS value of voltage
- B) Frequency
- C) Current
- D) Load resistance

Correct: A

3255. The gate cathode junction of SCR is always:

- A) Forward biased during conduction
- B) Reverse biased during conduction
- C) Reverse biased during triggering
- D) Forward biased in reverse blocking

Correct: A

3256. Thyristors are not preferred in:

- A) Relay control
- B) Frequency control
- C) Power switching
- D) Controlled rectifiers

Correct: B

3257. An SCR remains on as long as the anode current is:

- A) Less than holding current
- B) More than latching current
- C) Greater than holding current
- D) Less than gate current

Correct: C

3258. TRIAC is equivalent to:

- A) Two SCRs in series
- B) Two SCRs in parallel
- C) Two SCRs in anti-parallel
- D) One SCR and one BJT

Correct: C

3259. The SCR must be triggered into conduction in which region?

- A) Reverse blocking
- B) Forward blocking
- C) Conduction region
- D) Cut-off

Correct: B

3260. Which device offers symmetrical bidirectional control with a gate?

- A) SCR
- B) GTO
- C) TRIAC
- D) DIAC

Correct: C

3261. To ensure proper turn-off, an SCR must be:

- A) Heated
- B) Reverse biased
- C) Forward biased
- D) Gate pulsed

Correct: B

3262. Which of the following can protect thyristors from surge currents?

- A) RC snubber
- B) Pulse transformer
- C) Series inductor
- D) Fuse

Correct: D

3263. Which is a characteristic of SCR in the on-state?

- A) Acts as open switch
- B) Low voltage drop
- C) High resistance
- D) Reverse biased gate

Correct: B

3264. Which of the following is a major application of thyristors?

- A) Logic gates
- B) Voltage clamping
- C) Phase control
- D) Audio signal filtering

Correct: C

3265. Commutation circuits are used in:

- A) UJTs
- B) BJTs
- C) SCRs
- D) DIACs

Correct: C

3266. The turn-off process of a GTO requires:

- A) High voltage
- B) Negative gate current
- C) Reverse polarity supply
- D) High-frequency pulses

Correct: B

3267. The process of applying gate signal in synchronism with AC supply is called:

- A) Phase synchronization
- B) Natural firing
- C) Synchronous triggering
- D) Load commutation

Correct: C

3268. A TRIAC remains on until:

- A) Gate signal is removed
- B) Voltage drops
- C) Current through it drops below holding current
- D) Phase angle resets

Correct: C

3269. The maximum repetitive reverse voltage in an SCR is termed:

- A) VRRM
- B) VBO
- C) VBR
- D) VDRM

Correct: D

3270. In a single-phase full converter, the firing angle can vary between:

- A) 0° to 90°
- B) 0° to 180°
- C) 90° to 180°
- D) 180° to 360°

Correct: B

3271. Which device is known as a bidirectional trigger diode?

- A) DIAC
- B) TRIAC
- C) SCR
- D) LASCR

Correct: A

3272. An SCR is turned on by:

- A) Applying voltage across anode and cathode only
- B) Applying gate current with forward anode voltage
- C) Applying reverse voltage
- D) Heating the device

Correct: B

3273. Holding current in SCR is:

- A) Minimum anode current to keep SCR ON
- B) Maximum current before damage
- C) Gate current level
- D) Leakage current

Correct: A

3274. Which thyristor device can be switched off by applying a negative gate current?

- A) SCR
- B) GTO
- C) TRIAC
- D) DIAC

Correct: B

3275. The forward blocking voltage in an SCR is also called:

- A) Peak reverse voltage
- B) Peak forward voltage
- C) Breakover voltage
- D) Holding voltage

Correct: C

e) VVFD Drives

3276. What does VVVFD stand for?

- A) Variable Voltage Variable Frequency Drive
- B) Variable Voltage Voltage Frequency Device

- C) Variable Voltage Variable Frequency Device
- D) Variable Voltage Variable Force Drive

Correct: A

3277. The main function of a VVVFD is to:

- A) Convert AC to DC
- B) Control speed of an AC motor
- C) Convert DC to AC
- D) Control current in DC motors

Correct: B

3278. VVVFD controls the motor speed by:

- A) Varying the voltage only
- B) Varying the frequency only
- C) Varying both voltage and frequency
- D) Changing resistance in rotor

Correct: C

3279. Which type of motor is commonly used with VVVFD?

- A) DC motor
- B) Synchronous motor
- C) Induction motor
- D) Stepper motor

Correct: C

3280. Why is it important to vary both voltage and frequency in a VVVFD?

- A) To maintain constant torque
- B) To reduce losses
- C) To reduce size of motor
- D) To reduce noise

Correct: A

3281. The output frequency range of a VVVFD typically is:

- A) 0 - 50 Hz
- B) 0 - 400 Hz
- C) 0 - 100 Hz
- D) 0 - 500 Hz

Correct: B

3282. Which semiconductor device is commonly used in VVVFD inverter section?

- A) Diode
- B) SCR
- C) IGBT
- D) BJT

Correct: C

3283. **The process of converting AC to DC in a VVVFD is done by:**

- A) Rectifier
- B) Inverter
- C) Filter
- D) Converter

Correct: A

3284. **Which component smooths the DC voltage in a VVVFD?**

- A) Rectifier
- B) Capacitor
- C) Transformer
- D) Inductor

Correct: B

3285. **The inverter section of VVVFD converts:**

- A) AC to DC
- B) DC to AC
- C) AC to AC
- D) DC to DC

Correct: B

3286. **Pulse Width Modulation (PWM) in VVVFD is used to:**

- A) Control output voltage and frequency
- B) Rectify AC input
- C) Filter DC voltage
- D) Measure motor speed

Correct: A

3287. **Which waveform is typically output by a VVVFD inverter?**

- A) Pure sine wave
- B) Square wave
- C) Modified sine wave (PWM)
- D) Triangular wave

Correct: C

3288. **Why is a pure sine wave output preferred in VVVFD?**

- A) For smooth motor operation and reduced heating
- B) For better efficiency
- C) To reduce cost
- D) To increase frequency range

Correct: A

3289. **The VVVFD is connected between:**

- A) Power supply and motor

- B) Motor and load
- C) Power supply and load
- D) Generator and motor

Correct: A

3290. The motor speed in VVVFD is proportional to:

- A) Voltage only
- B) Frequency only
- C) Voltage/frequency ratio
- D) Power factor

Correct: C

3291. The term “base frequency” in VVVFD refers to:

- A) Maximum frequency output
- B) Supply frequency
- C) Rated frequency of motor
- D) Zero frequency

Correct: C

3292. The voltage/frequency ratio is kept constant to:

- A) Maintain motor torque
- B) Avoid overvoltage
- C) Reduce noise
- D) Increase power factor

Correct: A

3293. What is “flux weakening” in VVVFD?

- A) Increasing frequency above base frequency with reduced voltage
- B) Decreasing frequency and voltage simultaneously
- C) Increasing voltage without frequency change
- D) Reducing motor load

Correct: A

3294. Overvoltage protection in VVVFD is typically handled by:

- A) Circuit breaker
- B) Varistor
- C) Brake chopper
- D) Transformer

Correct: C

3295. Which type of braking is commonly used with VVVFD?

- A) Regenerative braking
- B) Mechanical braking
- C) Dynamic braking
- D) All of the above

Correct: D

3296. What is the function of a DC bus in a VVVF?

- A) To store energy in DC form
- B) To filter AC voltage
- C) To convert DC to AC
- D) To control frequency

Correct: A

3297. Which control method is most commonly used in VVVF?

- A) Scalar control (V/f control)
- B) Vector control (Field Oriented Control)
- C) Direct torque control
- D) All of the above

Correct: D

3298. Scalar control in VVVF adjusts:

- A) Voltage and frequency without feedback
- B) Flux and torque directly
- C) Motor speed by torque control
- D) Current and voltage independently

Correct: A

3299. Vector control in VVVF provides:

- A) Better dynamic performance and torque control
- B) Lower cost
- C) Simpler design
- D) Only speed control

Correct: A

3300. Which of the following is a disadvantage of scalar control?

- A) Complex implementation
- B) Poor performance at low speeds
- C) Requires feedback sensors
- D) High cost

Correct: B

3301. Direct Torque Control (DTC) controls:

- A) Voltage only
- B) Torque and flux directly
- C) Frequency only
- D) Voltage/frequency ratio

Correct: B

3302. Which sensor is commonly used to provide rotor position feedback?

- A) Tachometer

- B) Resolver
- C) Thermistor
- D) Capacitor

Correct: B

3303. **What is the advantage of sensorless vector control?**

- A) Lower cost and complexity
- B) Improved accuracy
- C) Requires less software
- D) Requires more sensors

Correct: A

3304. **The carrier frequency in PWM determines:**

- A) Motor speed
- B) Switching frequency of inverter devices
- C) Output voltage
- D) Input current

Correct: B

3305. **Increasing carrier frequency in PWM causes:**

- A) Higher switching losses
- B) Lower switching losses
- C) Reduced noise
- D) None of the above

Correct: A

3306. **Which device is used for speed feedback in VVVF?**

- A) Encoder
- B) Diode
- C) Capacitor
- D) Transformer

Correct: A

3307. **The main advantage of VVVF in HVAC systems is:**

- A) Energy saving by variable speed control
- B) Increased noise
- C) Constant speed operation
- D) Fixed frequency supply

Correct: A

3308. **Which of these is a common fault protection in VVVF?**

- A) Overcurrent protection
- B) Overvoltage protection
- C) Overtemperature protection
- D) All of the above

Correct: D

3309. **What is the purpose of an EMI filter in a VVFD?**

- A) Reduce electromagnetic interference
- B) Increase voltage
- C) Convert AC to DC
- D) Protect motor from overload

Correct: A

3310. **The term “ramp up” in VVFD refers to:**

- A) Speeding up motor gradually
- B) Decreasing voltage suddenly
- C) Increasing current abruptly
- D) Applying full power instantly

Correct: A

3311. **VVFD can improve process control by:**

- A) Reducing mechanical stress during startup
- B) Fixed speed operation
- C) Constant voltage only
- D) Increasing power consumption

Correct: A

3312. **Which parameter affects the torque production in induction motor controlled by VVFD?**

- A) Voltage only
- B) Frequency only
- C) Voltage to frequency ratio
- D) Power factor

Correct: C

3313. **The typical input supply voltage for industrial VVFD is:**

- A) 12 V
- B) 230 V single-phase
- C) 400 V three-phase
- D) 110 V DC

Correct: C

3314. **A bypass contactor in VVFD system is used to:**

- A) Connect motor directly to supply
- B) Bypass inverter faults
- C) Both A and B
- D) None of the above

Correct: C

3315. **Which of the following is NOT a benefit of using VVVFD?**

- A) Energy efficiency
- B) Reduced mechanical wear
- C) Reduced process control
- D) Improved system reliability

Correct: C

3316. **Which waveform causes additional motor heating in VVVFD?**

- A) Pure sine wave
- B) PWM waveform
- C) Square wave
- D) None of the above

Correct: C

3317. **The maximum torque capability of an induction motor is at:**

- A) Synchronous speed
- B) Slip zero
- C) Breakdown torque
- D) Locked rotor

Correct: C

3318. **What happens if voltage is not adjusted with frequency in VVVFD?**

- A) Motor torque will increase
- B) Motor may overheat due to flux saturation
- C) Motor speed will increase indefinitely
- D) Motor runs at rated torque

Correct: B

3319. **What is the effect of harmonics produced by VVVFD on the motor?**

- A) Increased heating and losses
- B) Improved efficiency
- C) Reduced noise
- D) Reduced torque

Correct: A

3320. **Which part of VVVFD is responsible for switching DC voltage into AC output?**

- A) Rectifier
- B) DC bus
- C) Inverter
- D) Filter

Correct: C

3321. **The DC link voltage in VVVFD depends on:**

- A) Input AC voltage
- B) Motor load
- C) Output frequency

D) PWM carrier frequency

Correct: A

3322. **What does “vector” refer to in vector control?**

A) The direction and magnitude of flux and torque

B) Motor speed only

C) Voltage amplitude

D) Input frequency

Correct: A

3323. **The typical response time of VVVFD is:**

A) Seconds

B) Milliseconds

C) Minutes

D) Hours

Correct: B

3324. **Which cooling method is commonly used for VVVFD units?**

A) Water cooling

B) Air cooling

C) Oil cooling

D) None of the above

Correct: B

3325. **The power factor of an induction motor controlled by VVVFD:**

A) Remains constant

B) Improves at low speeds

C) Decreases at low speeds

D) Is irrelevant

Correct: C

3326. **Which component protects the VVVFD from voltage spikes?**

A) Fuse

B) Snubber circuit

C) Inductor

D) Resistor

Correct: B

3327. **In VVVFD, the frequency resolution affects:**

A) Speed control accuracy

B) Voltage regulation

C) Motor heating

D) Input current quality

Correct: A

3328. The term “carrier frequency” in PWM is typically:

- A) 1-5 Hz
- B) 1-20 kHz
- C) 50 Hz
- D) 60 Hz

Correct: B

3329. Which of these is a common cause of failure in VVVFD systems?

- A) Overheating of IGBTs
- B) Incorrect motor wiring
- C) Improper grounding
- D) All of the above

Correct: D

3330. What is the function of a braking resistor in VVVFD?

- A) To slow down the motor by dissipating energy
- B) To increase motor speed
- C) To filter harmonics
- D) To increase torque

Correct: A

3331. Which protection setting prevents damage from excessive current?

- A) Overvoltage protection
- B) Overcurrent protection
- C) Undervoltage protection
- D) Thermal protection

Correct: B

3332. The “slip” of an induction motor controlled by VVVFD is:

- A) Zero at all speeds
- B) Variable depending on load and speed
- C) Constant at rated speed
- D) Irrelevant

Correct: B

3333. What is the typical efficiency of a VVVFD?

- A) 60-70%
- B) 80-90%
- C) 95-98%
- D) 40-50%

Correct: C

3334. Which of the following can be used to reduce motor bearing damage caused by VVVFD?

- A) Output reactor
- B) Shaft grounding kit
- C) EMI filter

D) Input choke

Correct: B

3335. **What is the role of the “DC bus” in a VVVFD?**

A) It stores energy temporarily as DC voltage

B) Converts DC to AC

C) Filters AC input voltage

D) Measures motor speed

Correct: A

3336. **Which of the following describes the “boost” function in VVVFD?**

A) Increasing voltage temporarily at low frequency to improve torque

B) Increasing motor speed beyond base speed

C) Increasing output frequency only

D) Reducing input current

Correct: A

3337. **Why are IGBTs preferred in modern VVVFDs?**

A) High switching speed and efficiency

B) Low cost

C) Simple control

D) High power loss

Correct: A

3338. **What happens if the VVVFD output frequency is higher than the motor’s rated frequency?**

A) Motor speed decreases

B) Motor speed increases above rated speed

C) Motor torque increases

D) Motor stalls

Correct: B

3339. **Which of the following is NOT a typical VVVFD application?**

A) Conveyor belts

B) Pump control

C) Lighting control

D) HVAC fans

Correct: C

3340. **Which parameter does NOT typically affect the life of VVVFD components?**

A) Ambient temperature

B) Switching frequency

C) Load variations

D) Motor color

Correct: D

3341. **The “ramp down” function in VVVFD helps to:**

- A) Gradually decrease motor speed
- B) Suddenly stop the motor
- C) Increase torque
- D) Decrease voltage only

Correct: A

3342. **Which of the following faults indicates excessive motor temperature?**

- A) Overcurrent fault
- B) Overvoltage fault
- C) Overtemperature fault
- D) Undervoltage fault

Correct: C

3343. **The “field weakening” operation allows motor speed to:**

- A) Operate above rated speed with reduced torque
- B) Operate below rated speed
- C) Increase torque
- D) Maintain constant torque

Correct: A

3344. **The main difference between VVVFD and a soft starter is:**

- A) VVVFD controls speed and torque, soft starter controls voltage during startup only
- B) Soft starter can control frequency
- C) VVVFD is cheaper
- D) Soft starter increases motor speed

Correct: A

3345. **Which device can be used to detect motor shaft position in a vector controlled VVVFD?**

- A) Hall effect sensor
- B) Thermistor
- C) Resistor
- D) Capacitor

Correct: A

3346. **The “dead time” in PWM refers to:**

- A) Time when both switches are off to prevent short circuit
- B) Time when motor is stopped
- C) Time between input phases
- D) Time when motor is at max speed

Correct: A

3347. **Which type of cooling is most commonly used in VVVFDs?**

- A) Forced air cooling
- B) Water cooling

- C) Oil cooling
- D) Passive cooling only

Correct: A

3348. The maximum output voltage of a VVFD inverter depends on:

- A) DC bus voltage
- B) Input current
- C) Switching frequency
- D) Motor load

Correct: A

3349. Which is NOT a typical method of VVFD control?

- A) Scalar control
- B) Vector control
- C) Direct torque control
- D) Frequency modulation control

Correct: D

3350. Which fault is caused by a short circuit inside the inverter?

- A) Overvoltage fault
- B) Short circuit fault
- C) Earth fault
- D) Overcurrent fault

Correct: B

3351. Why is it necessary to use an EMI filter with VVFD?

- A) To reduce electromagnetic interference generated by switching
- B) To increase voltage
- C) To stabilize motor speed
- D) To reduce power consumption

Correct: A

3352. What does “regenerative braking” mean in VVFD systems?

- A) Returning energy to the supply when slowing down
- B) Using mechanical brakes only
- C) Using resistors to dissipate energy
- D) Speeding up the motor

Correct: A

3353. Which is the most common input power supply for industrial VVFDs?

- A) 110V single-phase
- B) 230V single-phase
- C) 400V three-phase
- D) 12V DC

Correct: C

3354. **Which of these is NOT a benefit of vector control in VVVFD?**

- A) Precise torque control
- B) High dynamic response
- C) Simple hardware
- D) Efficient at low speeds

Correct: C

3355. **What type of waveform is produced by the inverter section of a VVVFD?**

- A) Pure sine wave
- B) Modified sine wave (PWM)
- C) Square wave
- D) Triangular wave

Correct: B

3356. **Why is proper grounding important in VVVFD systems?**

- A) To reduce electromagnetic interference and ensure safety
- B) To increase motor speed
- C) To reduce voltage
- D) To increase power consumption

Correct: A

3357. **Which of the following can cause nuisance tripping in VVVFD?**

- A) Incorrect parameter settings
- B) Motor overload
- C) Overvoltage
- D) All of the above

Correct: D

3358. **Which parameter determines the maximum speed of the motor in VVVFD?**

- A) Base frequency
- B) Carrier frequency
- C) Input voltage
- D) Output voltage

Correct: A

3359. **The braking chopper in VVVFD:**

- A) Dissipates regenerative energy in resistor
- B) Controls motor speed
- C) Converts DC to AC
- D) Measures motor load

Correct: A

3360. **Which type of motor is typically NOT suitable for VVVFD control?**

- A) Induction motor
- B) Synchronous motor
- C) Universal motor
- D) DC motor

Correct: D

3361. **The “torque ripple” in a motor controlled by VVVFD causes:**

- A) Vibration and noise
- B) Smooth operation
- C) Increased efficiency
- D) Reduced torque

Correct: A

3362. **The use of sine wave reactors in VVVFD is to:**

- A) Reduce harmonics and smooth output voltage
- B) Increase motor speed
- C) Reduce voltage
- D) Convert AC to DC

Correct: A

3363. **Which fault indicates the motor is drawing excessive current?**

- A) Undervoltage fault
- B) Overcurrent fault
- C) Earth fault
- D) Over Temperature fault

Correct: B

3364. **The DC bus voltage in a VVVFD is controlled by:**

- A) Input AC voltage and rectifier design
- B) Motor load
- C) Output frequency
- D) Carrier frequency

Correct: A

3365. **What is the function of the snubber circuit in VVVFD?**

- A) To protect switching devices from voltage spikes
- B) To increase voltage output
- C) To filter harmonics
- D) To control motor speed

Correct: A

3366. **The torque in an induction motor is proportional to:**

- A) Voltage only
- B) Frequency only
- C) Flux and rotor current
- D) Power factor

Correct: C

3367. **In VVVFD, “flux” refers to:**

- A) Magnetic flux in the motor

- B) Electric current in the motor
- C) Voltage output
- D) Frequency output

Correct: A

3368. What is the typical method for cooling VVVFDs in high-power applications?

- A) Forced air cooling
- B) Water cooling
- C) Oil cooling
- D) Natural convection

Correct: B

3369. Which of these devices is used to measure motor speed in feedback control?

- A) Encoder
- B) Capacitor
- C) Diode
- D) Inductor

Correct: A

3370. The term “latching current” in motor control refers to:

- A) Minimum current to keep device on after triggering
- B) Maximum current device can handle
- C) Gate current required to turn device on
- D) Holding current

Correct: A

3371. The typical switching frequency for VVVFD IGBTs is:

- A) 50 Hz
- B) 10 kHz - 20 kHz
- C) 1 MHz
- D) 500 Hz

Correct: B

3372. What type of feedback is used in sensorless vector control?

- A) Back-EMF estimation
- B) Speed encoder
- C) Temperature sensor
- D) Current transformer

Correct: A

3373. The main cause of “bearing currents” in VVVFD-driven motors is:

- A) PWM switching causing voltage spikes
- B) Overcurrent fault
- C) High temperature
- D) Incorrect grounding

Correct: A

3374. **A “flux sensor” in vector control is used to:**

- A) Measure motor flux for control algorithms
- B) Measure motor speed
- C) Measure output voltage
- D) Measure input current

Correct: A

3375. **What happens if the carrier frequency in PWM is too low?**

- A) Increased motor noise and vibration
- B) Reduced switching losses
- C) Increased motor efficiency
- D) Reduced torque ripple

Correct: A

3376. **What is the typical range for the output frequency of a VVVF?**

- A) 0 to 50 Hz
- B) 0 to 400 Hz
- C) 0 to 1000 Hz
- D) 50 to 60 Hz

Correct: B

3377. **Which device converts DC voltage back to AC in a VVVF?**

- A) Rectifier
- B) Inverter
- C) Transformer
- D) Converter

Correct: B

3378. **In a VVVF, the term “ramp time” refers to:**

- A) Time taken to reach target speed
- B) Time between two pulses
- C) Time for fault detection
- D) Time to shut down

Correct: A

3379. **Which of the following can cause harmonic distortion in VVVF input?**

- A) Non-linear load from the rectifier
- B) Linear resistive load
- C) Motor speed
- D) Frequency variation

Correct: A

3380. **The main advantage of PWM over square wave inverters is:**

- A) Reduced harmonic content and smoother motor current

- B) Lower cost
- C) Simpler design
- D) Increased power consumption

Correct: A

3381. **Which of these is a common output waveform of a VVVFD inverter?**

- A) Sinusoidal waveform
- B) Pulsed width modulated waveform
- C) Triangular waveform
- D) Sawtooth waveform

Correct: B

3382. **The term “voltage vector” in vector control means:**

- A) A quantity representing voltage magnitude and phase
- B) Voltage at the supply only
- C) Voltage measured in DC bus
- D) Output voltage amplitude only

Correct: A

3383. **What is the purpose of a reactor in the input of a VVVFD?**

- A) To limit inrush current and reduce harmonics
- B) To increase voltage
- C) To smooth output waveform
- D) To increase speed

Correct: A

3384. **Which method does VVVFD use to achieve variable speed in a three-phase induction motor?**

- A) Adjusting voltage only
- B) Adjusting frequency only
- C) Adjusting both voltage and frequency
- D) Adjusting current only

Correct: C

3385. **Which control strategy is best suited for high dynamic performance in VVVFD?**

- A) Scalar control
- B) Vector control
- C) On/off control
- D) Open loop control

Correct: B

3386. **Which parameter is critical to maintain constant torque in a VVVFD drive?**

- A) Constant voltage to frequency ratio
- B) Constant current only
- C) Constant frequency only
- D) Constant power factor

Correct: A

3387. **What does the term “field oriented control” mean in VVVFD?**

- A) Control of motor flux and torque vectors independently
- B) Control of input voltage only
- C) Control of speed only
- D) Control of current only

Correct: A

3388. **Which of these can be a reason for motor overheating in VVVFD operation?**

- A) Improper voltage/frequency ratio
- B) Overload
- C) Harmonics
- D) All of the above

Correct: D

3389. **The speed of an induction motor controlled by VVVFD is proportional to:**

- A) Frequency of the supply
- B) Voltage applied
- C) Current input
- D) Power factor

Correct: A

3390. **Which device measures the actual motor speed for feedback in vector control?**

- A) Encoder
- B) Potentiometer
- C) Resistor
- D) Capacitor

Correct: A

3391. **What is the main purpose of a DC link capacitor in VVVFD?**

- A) To smooth DC voltage and provide energy storage
- B) To convert AC to DC
- C) To measure voltage
- D) To filter output waveform

Correct: A

3392. **Which of the following limits the maximum frequency output in VVVFD?**

- A) Motor rated frequency
- B) Input voltage
- C) Load torque
- D) Carrier frequency

Correct: A

3393. **What causes voltage spikes in VVVFD output?**

- A) PWM switching and cable reflections

- B) Low input voltage
- C) Motor overload
- D) Constant voltage operation

Correct: A

3394. **The term “carrier frequency” in PWM relates to:**

- A) Frequency of the switching device
- B) Frequency of the motor output
- C) Input supply frequency
- D) Harmonic frequency

Correct: A

3395. **In VVVFD, the term “flux weakening” allows:**

- A) Operation above rated speed with reduced torque
- B) Operation below rated speed with increased torque
- C) Constant torque at all speeds
- D) Motor to stop safely

Correct: A

3396. **Which of the following is NOT a typical protective feature of VVVFD?**

- A) Overcurrent protection
- B) Earth fault detection
- C) Motor insulation test
- D) Overtemperature protection

Correct: C

3397. **Which technology is commonly used to implement the inverter stage in modern VVVFD?**

- A) IGBT modules
- B) SCRs
- C) BJTs
- D) Diodes

Correct: A

3398. **What happens when the load torque increases suddenly in a VVVFD controlled motor?**

- A) Motor speed decreases temporarily
- B) Motor speed increases
- C) Motor stalls immediately
- D) Motor accelerates

Correct: A

3399. **The term “base speed” refers to:**

- A) Rated motor speed at rated frequency
- B) Maximum speed of motor
- C) Zero speed
- D) Minimum speed

Correct: A

3400. **What is the purpose of the “ramp up” function in VVVFD?**

- A) To gradually increase motor speed to avoid mechanical stress
- B) To instantly start the motor
- C) To decrease voltage abruptly
- D) To shut down the motor

Correct: A

3401. **Which of these is NOT a common cause of noise in VVVFD operation?**

- A) PWM switching frequency
- B) Loose motor mounts
- C) Incorrect grounding
- D) Low carrier frequency

Correct: D

3402. **The “dead time” in PWM switching is used to:**

- A) Prevent simultaneous conduction of power devices
- B) Increase motor speed
- C) Reduce input voltage
- D) Smooth output waveform

Correct: A

3403. **Which of the following can cause nuisance tripping in a VVVFD?**

- A) Incorrect parameter settings
- B) Motor overload
- C) Overvoltage
- D) All of the above

Correct: D

3404. **What is the typical switching frequency range for PWM in VVVFD?**

- A) 1-5 Hz
- B) 5-20 kHz
- C) 50-60 Hz
- D) 100-200 Hz

Correct: B

3405. **Which of the following is used to prevent damage during regenerative braking?**

- A) Braking chopper
- B) Rectifier
- C) Inverter
- D) Capacitor

Correct: A

3406. **The main advantage of sensorless vector control is:**

- A) Reduced cost and complexity

- B) Higher accuracy than with sensors
- C) Easier tuning
- D) Less responsive

Correct: A

3407. Which of these devices measures rotor position in vector control?

- A) Resolver
- B) Capacitor
- C) Diode
- D) Resistor

Correct: A

3408. Why is proper grounding essential in VVVFD installations?

- A) To reduce electromagnetic interference and ensure personnel safety
- B) To increase motor speed
- C) To reduce input voltage
- D) To increase power factor

Correct: A

3409. Which type of motor is most commonly controlled by VVVFDs?

- A) Synchronous motor
- B) Induction motor
- C) DC motor
- D) Universal motor

Correct: B

3410. What is the purpose of an EMI filter in a VVVFD system?

- A) Reduce electromagnetic interference caused by switching
- B) Increase input voltage
- C) Control motor speed
- D) Reduce output frequency

Correct: A

3411. Which parameter directly affects the torque output in an induction motor controlled by VVVFD?

- A) Voltage to frequency ratio
- B) Input power factor
- C) Load resistance
- D) Ambient temperature

Correct: A

3412. Which protection device protects the VVVFD from high temperatures?

- A) Thermistor or temperature sensor
- B) Fuse
- C) Rectifier
- D) Inverter

Correct: A

3413. **Which of the following is NOT a function of the rectifier in a VVVF?**

- A) Converts AC to DC
- B) Smooths the output voltage
- C) Provides DC link voltage
- D) Input stage of VVVF

Correct: B

3414. **In VVVF operation, “torque ripple” can cause:**

- A) Motor vibration and noise
- B) Increased efficiency
- C) Reduced motor temperature
- D) Smooth motor operation

Correct: A

3415. **Why is it necessary to maintain a constant V/f ratio in VVVF?**

- A) To maintain constant magnetic flux and torque
- B) To reduce noise
- C) To increase efficiency only at low speeds
- D) To reduce switching losses

Correct: A

3416. **The term “carrier” in PWM stands for:**

- A) The high-frequency triangular waveform used to modulate the output
- B) The output voltage
- C) The input frequency
- D) The motor speed

Correct: A

3417. **What is the impact of high switching frequency in VVVF?**

- A) Reduced motor noise but increased switching losses
- B) Increased motor noise and decreased efficiency
- C) Reduced motor temperature
- D) No effect

Correct: A

3418. **Which of the following is a key advantage of vector control over scalar control?**

- A) Better dynamic performance and precise torque control
- B) Lower hardware cost
- C) Simpler software
- D) Less complex tuning

Correct: A

3419. **Which parameter is adjusted in field weakening control?**

- A) Motor flux

- B) Motor speed
- C) Input current
- D) Output voltage

Correct: A

3420. Why are IGBTs commonly used in VVVF inverters?

- A) High switching speed and efficiency
- B) Low voltage rating
- C) Simple control
- D) Low cost only

Correct: A

3421. Which is a common fault indication in VVVF when output current exceeds limit?

- A) Overcurrent fault
- B) Overvoltage fault
- C) Earth fault
- D) Undervoltage fault

Correct: A

3422. The DC link capacitor in a VVVF serves to:

- A) Store energy and smooth the DC voltage
- B) Convert AC to DC
- C) Measure voltage
- D) Control speed

Correct: A

3423. What type of waveform is generated by a VVVF inverter output?

- A) PWM approximated sine wave
- B) Pure sine wave
- C) Square wave
- D) Triangular wave

Correct: A

3424. Which of the following can cause premature failure of VVVF components?

- A) High ambient temperature
- B) Voltage spikes
- C) Excessive switching frequency
- D) All of the above

Correct: D

3425. The braking resistor in a VVVF system:

- A) Dissipates excess energy during braking
- B) Increases motor speed
- C) Filters input harmonics
- D) Controls frequency

Correct: A

3426. **Which of these is a common cause of VVVFD inverter overheating?**

- A) Inadequate cooling
- B) Low input voltage
- C) Excessive braking resistor use
- D) Slow motor speed

Correct: A

3427. **What is the function of the snubber circuit in VVVFD?**

- A) Protects switching devices from voltage spikes
- B) Converts DC to AC
- C) Controls output frequency
- D) Measures motor speed

Correct: A

3428. **The term “latching current” in power devices means:**

- A) Minimum current needed to keep the device on after triggering
- B) Maximum allowable current
- C) Triggering current
- D) Holding current

Correct: A

3429. **Which type of motor is typically controlled using sensorless vector control?**

- A) Induction motor
- B) DC motor
- C) Universal motor
- D) Stepper motor

Correct: A

3430. **Which fault occurs due to ground leakage current in VVVFD?**

- A) Earth fault
- B) Overcurrent fault
- C) Overvoltage fault
- D) Thermal fault

Correct: A

3431. **Why is shaft grounding recommended in VVVFD-driven motors?**

- A) To prevent bearing damage caused by shaft currents
- B) To increase torque
- C) To reduce noise
- D) To increase efficiency

Correct: A

3432. **What is the typical range of voltage in a three-phase industrial VVVFD system?**

- A) 220V to 480V
- B) 12V to 24V
- C) 110V to 230V

D) 1000V to 1200V

Correct: A

3433. **Which device is used to provide feedback of rotor position in vector control?**

- A) Resolver
- B) Thermistor
- C) Diode
- D) Capacitor

Correct: A

3434. **What is the effect of increasing carrier frequency in PWM on motor?**

- A) Reduced audible noise but increased switching losses
- B) Increased torque ripple
- C) Decreased efficiency
- D) Increased motor heating only

Correct: A

3435. **Which device converts AC to DC in the VVFD?**

- A) Rectifier
- B) Inverter
- C) Transformer
- D) Capacitor

Correct: A

3436. **The braking chopper is connected across:**

- A) DC bus capacitor
- B) Input AC supply
- C) Output to motor
- D) Ground

Correct: A

3437. **What is a common cause of overcurrent fault in VVFD?**

- A) Motor stall or sudden load increase
- B) Low input voltage
- C) Incorrect grounding
- D) High ambient temperature

Correct: A

3438. **Why is it important to maintain a constant V/f ratio in scalar control?**

- A) To maintain constant motor flux and torque
- B) To reduce switching losses
- C) To increase speed only
- D) To minimize noise

Correct: A

3439. **Which of these parameters is typically adjustable in VVVFD programming?**

- A) Acceleration and deceleration times
- B) Input voltage
- C) Motor winding resistance
- D) Output power factor

Correct: A

3440. **What does “field weakening” in VVVFD allow?**

- A) Motor speed operation above rated speed with reduced torque
- B) Constant torque at all speeds
- C) Motor stall protection
- D) Reduced motor temperature

Correct: A

3441. **Which is NOT a typical feature of a VVVFD?**

- A) Variable speed control
- B) Soft start/stop
- C) Power factor correction
- D) Direct current supply to motor

Correct: D

3442. **Which of the following is a type of control used in VVVFD for precise torque control?**

- A) Vector control
- B) On/off control
- C) Pulse control
- D) Analog control

Correct: A

3443. **The “carrier frequency” in PWM affects:**

- A) Audible noise and switching losses
- B) Motor size
- C) Motor winding temperature
- D) Input current only

Correct: A

3444. **Which protective device can trip due to motor overload in VVVFD?**

- A) Overcurrent protection
- B) Earth leakage breaker
- C) Undervoltage relay
- D) Rectifier fuse

Correct: A

3445. **The output voltage of a VVVFD is controlled by:**

- A) Modulating the pulse width of inverter switches
- B) Changing input voltage

- C) Adjusting motor winding resistance
- D) Changing motor load

Correct: A

3446. **Which component is essential for energy storage and filtering in VVVFD DC link?**

- A) Capacitor
- B) Inductor
- C) Transformer
- D) Resistor

Correct: A

3447. **What does “ramp down” time in VVVFD control?**

- A) Time to decelerate motor to stop or low speed
- B) Time to increase speed
- C) Time to switch off power
- D) Time to cool the motor

Correct: A

3448. **Which is NOT a consequence of incorrect V/f ratio setting?**

- A) Motor overheating
- B) Reduced torque
- C) Increased efficiency
- D) Excessive current draw

Correct: C

3449. **What is the function of a reactor on the output side of a VVVFD?**

- A) Reduce voltage spikes and harmonics
- B) Increase motor speed
- C) Convert AC to DC
- D) Control output frequency

Correct: A

3450. **Which device is often used to detect speed in closed loop VVVFD systems?**

- A) Encoder
- B) Thermistor
- C) Capacitor
- D) Resistor

Correct: A

3451. **Which of the following best describes PWM technique?**

- A) Varying pulse width to control voltage and frequency
- B) Fixed pulses with varying frequency
- C) Varying current amplitude
- D) Varying resistance

Correct: A

3452. **Which fault is caused when motor is not connected properly to VVVF?**

- A) Motor phase loss or open phase fault
- B) Overvoltage fault
- C) Earth fault
- D) Thermal fault

Correct: A

3453. **Why are high switching frequencies used in VVVF?**

- A) To reduce motor noise and improve performance
- B) To reduce power consumption
- C) To increase motor size
- D) To simplify control

Correct: A

3454. **Which parameter indicates motor torque in sensorless vector control?**

- A) Estimated rotor flux and current
- B) Input voltage
- C) Output frequency
- D) Motor speed only

Correct: A

3455. **The DC bus voltage in VVVF is determined by:**

- A) Input AC voltage and rectifier design
- B) Motor speed
- C) Load torque
- D) Carrier frequency

Correct: A

3456. **Which device protects the VVVF against short circuits?**

- A) Fuse or circuit breaker
- B) Capacitor
- C) Inductor
- D) Thermistor

Correct: A

3457. **Why is it important to use shielded cables between VVVF and motor?**

- A) To reduce electromagnetic interference and voltage spikes
- B) To increase power factor
- C) To reduce motor speed
- D) To improve efficiency

Correct: A

3458. **Which of the following is a symptom of VVVF motor bearing damage?**

- A) Increased vibration and noise
- B) Reduced speed
- C) Reduced power consumption

D) Increased torque

Correct: A

3459. **The “vector control” technique uses feedback from:**

A) Speed, current, and position sensors

B) Only voltage sensors

C) Temperature sensors

D) Load sensors only

Correct: A

3460. **Which factor is NOT affected by VVVFD operation?**

A) Motor speed

B) Motor torque

C) Motor color

D) Power consumption

Correct: C

3461. **Which of the following is NOT a function of braking resistor?**

A) Absorb energy during deceleration

B) Increase motor speed

C) Protect VVVFD from regenerative energy

D) Prevent overvoltage on DC bus

Correct: B

3462. **What is the typical PWM switching frequency for quiet operation?**

A) Above 10 kHz

B) Below 1 kHz

C) 50 Hz

D) 100 Hz

Correct: A

3463. **Which is the main disadvantage of high switching frequency in VVVFD?**

A) Increased switching losses and heat generation

B) Increased noise

C) Reduced efficiency

D) Reduced speed

Correct: A

3464. **Which type of VVVFD control provides the best dynamic response?**

A) Vector control

B) Scalar control

C) On/off control

D) Open loop control

Correct: A

3465. **Why is it necessary to use a snubber circuit in VVFD?**

- A) To protect IGBTs from voltage spikes during switching
- B) To increase output frequency
- C) To reduce input current
- D) To increase power consumption

Correct: A

3466. **Which device measures motor temperature for protection?**

- A) Thermistor
- B) Capacitor
- C) Diode
- D) Encoder

Correct: A

3467. **What happens if VVFD output frequency exceeds motor rated frequency?**

- A) Motor operates in field weakening region with reduced torque
- B) Motor speed decreases
- C) Motor stalls
- D) Motor voltage increases

Correct: A

3468. **What type of feedback does sensorless control estimate in VVFD?**

- A) Rotor speed and flux
- B) Motor voltage
- C) Motor load
- D) Line current

Correct: A

3469. **Which function in VVFD ensures smooth motor acceleration?**

- A) Acceleration ramp
- B) Sudden start
- C) Load limiter
- D) Line reactor

Correct: A

3470. **Which waveform is closest to the VVFD inverter output?**

- A) PWM-modulated waveform
- B) Pure sine wave
- C) Triangular wave
- D) Square wave

Correct: A

3471. **Which parameter is critical for controlling speed in VVFD?**

- A) Output frequency
- B) Input voltage
- C) Switching losses

D) Output impedance

Correct: A

3472. **Which component in VVVF may cause harmonics on power lines?**

A) Rectifier

B) Inverter

C) Filter

D) Reactor

Correct: A

3473. **What is one of the main causes of torque ripple in scalar control?**

A) Inaccurate voltage/frequency matching

B) Low input voltage

C) Constant speed operation

D) High power factor

Correct: A

3474. **Which application requires precise torque control using VVVF?**

A) Hoists and cranes

B) Ceiling fans

C) Lighting systems

D) Electric heaters

Correct: A

3475. **What is the primary purpose of VVVF?**

A) Control motor speed and torque efficiently

B) Convert AC to DC

C) Act as a backup power supply

D) Replace electric motors

Correct: A

3. SPECIFIC APPLICATIONS IN SHOP AREAS

a. Simple Block Schematics of temperature controls of Axle Shop and Wheel Shop Furnaces

3476. The type of temperature sensor used in quench tank at Axle shop/RWF?

a) RTD

b) S type

c) N type

d) J type

Answer :A

3477. The furnaces temperature in Old forge shop is controlled with the help of

- a) Open loop control system
- b) Closed loop control system
- c) Both A and B
- d) None of these

Answer :B

3478. The type of thermocouple used in Normalising Furnace of Axle Shop is

- a) S Type.
- b) K type.
- c) N type
- d) J type

3479. The type of Thermocouple used in RHF of New Axle Forge Shop?

- a) S type
- b) R type
- c) J type
- d) N type

Answer: A

3480. PLC used for Temperature control in Old forge Complex is

- a) Allen Bradley
- b) Siemens
- c) Mitsubishi
- d) Fanuc

Answer: A

3481. PLC used for Temperature control in New forge Complex is

- a) Allen Bradley
- b) Siemens
- c) Mitsubishi
- d) Fanuc

Answer: B

3482. In the Schematic for Temperature Control for RHF, which element is responsible for measurement of Temperature

- a) Thermocouple
- b) PNG Pressure Transmitter
- c) Gas Control Valve
- d) Furnace pressure transmitter

3483. What is the main function of PLC(Allen Bradley) in Temperature Control system of RHF (Old Forge)

- a) Measure gas pressure
- b) Transmit Temperature Data to SCADA
- c) PID control to control temperature
- d) Increase gas supply

Answer : C

3484. In RHF , PID Controller out put is used to modulate _____to control temperature

- a) HMI Display Value
- b) Thermocouple Voltage
- c) Flue gas measurement
- d) Gas & Air Control Valves

Answer : D

3485. What is the function of HMI display in Temperature Control system at Old forge complex

- a) To Send signal to control valves
- b) Measure Pressure
- c) Act as a back up controller
- d) Display process values & Set Point Entry

Answer : D

3486. In Temperature Control System at Forge shop, Which parameter is the process variable (PV) for the PID loop

- a) Gas Valve opening percentage
- b) PNG Pressure
- c) Temperature measured by thermocouple
- d) Air pressure Answer : C

3487. The Flue gas temperature is measured, mainly in temperature control system of Forge shop mainly to

- a) Protect Thermocouple
- b) Adjust Combustion Air/Fuel for efficiency
- c) Regulate Cooling system
- d) Open bypass Valve Answer : B

3488. The Energy saving system used in RHF

- a) Recuperator
- b) Blower
- c) Compressor
- d) Charging Arm Answer : A

3489. Which of the following is not a part of Temperature control system

- a) PID Controller
- b) Thermocouple
- c) Furnace Door
- d) Gas flow control Valve Answer : C

3490. What is the typical working temperature of RHF in Axle shop

- a) Around 400 Deg C
- b) Around 700 Deg C
- c) Around 1000 Deg C
- d) Around 1200 Answer D

3491. What is the primary function of the Burner Control Unit (BCU) in a RHF system?

- A) To regulate furnace pressure
- B) To manage ignition, flame sensing, and burner safety interlocks
- C) To control air-fuel mixing ratios
- D) To monitor load temperature Answer: B)

3492. In RHF-NF-TF Temperature control system, the ignition transformer is used to:

- A) Increase flame detection sensitivity
- B) Control flue gas temperature
- C) Generate high-voltage spark for burner ignition
- D) Convert analog signals to digital

Answer: C)

3493. In the RHF control schematic, the flame sensor is used to:

- A) Detect thermocouple faults
- B) Verify successful burner ignition and continuous flame presence
- C) Measure oxygen levels in flue gas
- D) Monitor air pressure in the burner line Answer: B)

3494. The Normalizing Furnace (NF) in axle treatment is primarily used to:

- A) Cool the axle rapidly
- B) Soften the axle for machining
- C) Refine the grain structure by heating above transformation temperature and air-cooling
- D) Harden the axle surface only Answer: C)

3495. What happens if the flame sensor fails to detect a flame after ignition in RHF ?

- A) The PLC ignores it and continues
- B) The BCU continues gas flow
- C) The BCU shuts off fuel supply and generates a fault
- D) The thermocouple adjusts temperature Answer: C)

3496. Which device ensures that the burner does not operate when there's no flame or unsafe condition used for temperature control in RHF?

- A) PID controller

- B) Burner Control Unit (BCU)
- C) Furnace damper
- D) Air regulator Answer: B)

3497. In Old Forge Shop __ Which is True

- a) RHF, NF & TF Temperature is controlled by single PLC
- b) RHF & NF Temperature is controlled by single PLC
- c) NF & TF Temperature is controlled by single PLC
- d) All furnace Temperature controlled individually

Answer: A

3498. The Software required to Trouble shoot PLC of Temperature Control system in Old Forge Complex

- a) Step 7
- b) TIA Portal
- c) Studio Logix 5000
- c) Rs logic 500

Answer : C

3499. The software required to edit / modify HMI Screen of Temperature Control System of RHF

- a) Factory Talk View
- b) HMI Advance
- c) TIA Portal
- c) Step7

Answer A

3500. In an RHF control system, the Air-Fuel Ratio (AFR) is maintained electronically to:

- A) Maximize flue gas temperature
- B) Ensure complete combustion and optimize thermal efficiency
- C) Increase furnace load quickly
- D) Improve ignition transformer output Answer: B)

3501. What is the effect of an improper AFR (too rich or too lean) in a gas-fired furnace?

- A) PID controller resets automatically
- B) Lower burner life and increased unburned fuel emissions
- C) Enhanced thermal efficiency
- D) Improved PLC scan time Answer: B)

3502. In PID-based electronic control for PNG burning(NF), what does the integral term (I) primarily help to eliminate?

- A) Overshoot
- B) High frequency noise

- C)Steady-state error
- D) Sensor drift

Answer: C)

3503. Operator claims that , Temperature is not attaining 1200 Degree C In RHF. It was noticed that SP of Temperature is 1020 Degree & PV is 1025 Degree. Possible Cause for Temperature not attaining 1200 Degree.

- A)Operator has wrongly set 1020 Degree instead of 1200
- B)Burner Trips
- C)Less Gas pressure
- D) Low Air Pressure

Answer : A

3504. In a PLC-based PID loop used in RHF , the derivative term (D) is used to:

- A)Eliminate steady-state error
- B)Reduce overshoot
- C)Convert analog input to digital
- D) Stabilize voltage fluctuations Answer: B)

3505. Which of the following is used as the manipulated variable in a PID loop controlling NF temperature in a PLC?

- A)S-type thermocouple
- B)Gas/Air control valve position
- C)Furnace door actuator
- D) PLC scan cycle timer

Answer:B)

3506. A PID block in PLC gets its process variable (PV) from:

- A)The output of the burner
- B)The HMI
- C)The connected sensor (thermocouple)
- D) The operator panel Answer: C

3507. In a PLC logic diagram, the setpoint (SP) for temperature control is:

- A)Always hardcoded in the PLC firmware
- B)The maximum value from the thermocouple

- C) User-defined input through HMI or SCADA
- D) Measured by the flame sensor Answer: C)

3508. typical advantage of using PLC-based PID control in furnaces is:

- A) Higher gas pressure output
- B) Constant furnace temperature regardless of load
- C) Real-time control with flexibility for tuning and interlocks
- D) Automatic replacement of faulty sensors

Answer C

3509. In New Forge Complex, RHF Control system

- a) Displays all zone temperature & Burner Status
- b) Displays only zone wise temperature
- c) Displays only Burner Status
- D) Display Only Specific zones status

Answer:A

3510. In NAFL, RHF Temperature control system exchanges signals with

- a) Long Forging Machine's Control System
- b) Distributed Control System Used for Conveyor & Coordination
- c) Both A&B
- d) None

Answer :C

3511. What is the main objective of a temperature control system in an oil-fired furnace in a wheel shop?

- A) Maintain furnace humidity
- B) Control temperature accurately for heat treatment
- C) Reduce metal hardness
- D) Increase oil viscosity

Correct Answer: B

3512. In the block schematic, the **setpoint** refers to:

- A) The temperature of cooling air
- B) The target furnace temperature
- C) Oil level in the tank
- D) The speed of the fan

Correct Answer: B

3513. Which device typically acts as the **sensor** in a temperature control system?

- A) Pressure gauge

- B) Flowmeter
- C) Thermocouple or RTD
- D) Ultrasonic transducer

Correct Answer: C

3514. The **controller** in the system processes:

- A) Voltage readings
- B) Error signal (difference between setpoint and actual temperature)
- C) Oil flow
- D) Fan speed only

Correct Answer: B

3515. What component receives the controller's output and adjusts the furnace conditions?

- A) Sensor
- B) Actuator (e.g., oil valve or burner modulator)
- C) Mold
- D) Thermometer

Correct Answer: B

3516. In oil-fired furnaces, the **actuator** commonly adjusts:

- A) Fuel oil flow and air supply to burners
- B) Mold shape
- C) Wheel casting pressure
- D) Coolant pump

Correct Answer: A

3517. The **feedback signal** in this system represents:

- A) Oil pressure
- B) Air speed
- C) Actual furnace temperature
- D) Wheel size

Correct Answer: C

3518. A **PID controller** is preferred in furnace systems because it:

- A) Cools the furnace faster
- B) Offers precise and stable temperature control
- C) Replaces thermocouples
- D) Increases oil consumption

Correct Answer: B

3519. The **process variable** in the temperature control block schematic is:

- A) Desired temperature
- B) Fan current
- C) Actual furnace temperature
- D) Operator input

Correct Answer: C

3520. What is the role of a **comparator** in a closed-loop temperature control system?

- A) Measures fuel level

- B) Compares setpoint with feedback temperature
- C) Filters air supply
- D) Switches off the burner

Correct Answer: B

3521. A **thermocouple** is best suited for furnace control because:

- A) It has low cost and fast response
- B) It needs no calibration
- C) It controls pressure
- D) It runs the actuator

Correct Answer: A

3522. The **output** of the controller is used to:

- A) Open the furnace door
- B) Adjust burner intensity or oil valve
- C) Increase wheel speed
- D) Reduce mold flow

Correct Answer: B

3523. **Disturbances** in the furnace control loop can be caused by:

- A) Fluctuating oil supply
- B) Ambient temperature changes
- C) Heat loss during door opening
- D) All of the above

Correct Answer: D

3524. The **input** to the control system in block schematic terms is:

- A) Power supply voltage
- B) Desired temperature (setpoint)
- C) Sensor calibration
- D) Furnace material type

Correct Answer: B

3525. In temperature control, the **dead time** refers to:

- A) Delay between turning off the fan and cooling
- B) Time between controller output and temperature response
- C) Sensor calibration time
- D) Burner ignition delay

Correct Answer: B

3526. In wheel shops, maintaining precise furnace temperature is critical for:

- A) Aesthetic finish of wheels
- B) Metallurgical properties and structural integrity
- C) Wheel diameter
- D) Noise control

Correct Answer: B

3527. The **actuator** can be:

- A) Modulating burner

- B) Servo-controlled oil valve
- C) Variable air damper
- D) All of the above

Correct Answer: D

3528. What type of control action may result in the system responding too quickly and overshooting?

- A) Integral only
- B) Proportional only
- C) Derivative only
- D) PID

Correct Answer: B

3529. In an oil-fired furnace, temperature control failure could lead to:

- A) Incomplete heat treatment
- B) Fuel wastage
- C) Component damage
- D) All of the above

Correct Answer: D

3530. Closed-loop control is preferred in furnace systems because:

- A) It is cheaper
- B) It eliminates the need for sensors
- C) It continuously adjusts to reach and maintain setpoint
- D) It allows manual override

Correct Answer: C

3531. A burner control unit in the actuator block regulates:

- A) Combustion air and fuel mixture
- B) Wheel speed
- C) Mold position
- D) Exhaust fan noise

Correct Answer: A

3532. A digital temperature controller typically uses:

- A) Bimetallic strip
- B) Relay logic
- C) Microprocessor-based logic
- D) Magnetic compass

Correct Answer: C

3533. The output signal from a PID controller could be:

- A) ON/OFF
- B) Analog (4–20 mA or 0–10 V)
- C) Binary
- D) None of the above

Correct Answer: B

3534. The **response time** of the control system affects:

- A) Visual appearance of wheels
- B) Furnace structure
- C) Accuracy of temperature control
- D) Fuel tank size

Correct Answer: C

3535. In modern wheel shops, temperature control systems are often integrated with:

- A) Conveyor belts
- B) SCADA or HMI systems for real-time monitoring
- C) Gear systems
- D) Water pumps

Correct Answer: B

b) Operations and controls of EOT Cranes

3536. Which is not a common maintenance hazard with cranes

- A) Damage to wire rope
- B) Alignment Issues
- C) Bent/ damaged hooks
- D) Chipped Paint

Ans: D

3537. An overhead crane that consist of parallel runways with a travelling bridge is known as

- A) Road mobile Crane
- B) Monorail Crane
- C) Bridge crane
- D) Jib crane

Ans: C

3538. Type of crane where a horizontal beam extends to lift and move a load along the beam is known as

- A) Gantry Crane
- B) Monorail Crane
- C) Bridge crane
- D) Jib crane

Ans: D

3539. A crane that is shut down for various reasons should be

- A) Sold out
- B) Kept Open
- C) Locked out and tagged out
- D) Painted black

Ans: C

3540. Preventive maintenance is

- A) Maintenance carried out before an issue is identified
- B) Maintenance carried out after an issue is identified
- C) Maintenance carried out after an accident
- D) None of the above

Ans: A

3541. What is full form of L.T pertaining to EOT cranes?

- A) Limited travel
- B) Longitudinal travel
- C) Long travel
- D) Lengthy travel

Ans: B

3542. What is full form of C.T pertaining to EOT cranes?

- A) Complete travel
- B) Common travel
- C) Cross travel
- D) Close travel

Ans: C

3543. What is the full form of M.H pertaining to EOT cranes?

- A) Material Handling
- B) Mini Hoist
- C) Main Hoist
- D) Main Handle

Ans: C

3544. What is full form of A.H pertaining to EOT cranes?

- A) Additional Handle
- B) Auxiliary Hoist
- C) Additional Hoist
- D) None of the above

Ans: B

3545. Hand signal during operations are used when

- A) the operator is deaf
- B) voice communications can not be heard
- C) rigger is dumb
- D) none of the above

Ans: B

3546. _____ is used to douse general fire

- A) Fire extinguisher

- B) Life guard
- C) Alcohol
- D) Air blowing

Ans: A

3547. Crane driver should accept emergency stop from

- A) Only rigger engaged with his crane
- B) all riggers at site
- C) anybody working at site
- D) Only his supervisor

Ans: C

3548. At a time crane driver should accept signals from

- A) Only rigger engaged with his crane
- B) all riggers at site
- C) anybody working at site
- D) Only his supervisor

Ans: A

3549. Total number of EOT cranes in the Axle Forge shop is

- A) 2
- B) 4
- C) 5
- D) 3

Ans: C

3550. Total number of EOT cranes in the Axle machine shop is

- A) 2
- B) 4
- C) 3
- D) 5

Ans: B

3551. Total number of EOT cranes in the Axle Assembly Bay is

- A) 1
- B) 2
- C) 3
- D) 4

Ans: D

3552. Total number of EOT cranes in the Wheelset loading Bay is

- A) 2
- B) 3
- C) 4
- D) 5

Ans: B

3553. Total number of EOT cranes in the SPC Bay is

- A) 2
- B) 3
- C) 4
- D) 5

Ans: C

3554. Axle Shop Control is carrying out the electrical maintenance activities of _____ number of cranes in RWF

- A) 13
- B) 16
- C) 20
- D) 21

Ans: C

3555. 10 Ton capacity crane is used in which area of the Axle shop?

- A) Forge Shop
- B) Machine Shop
- C) Assembly Shop
- D) None of the above

Ans: B

3556. All the Assembly shop cranes are of

- A) 10T
- B) 5T
- C) 15T
- D) 3T

Ans: B

3557. Capacity of Axle forge shop cranes is

- A) 5T
- B) 10T
- C) 15T
- D) 20T

Ans: C

3558. Maximum used Auxiliary hoist capacity of EOT cranes in Axle shop is

- A) 2T
- B) 3T
- C) 5T
- D) None of the above

Ans: D

3559. The safety devices of EOT cranes include

- A) Anti Collision device
- B) Rotary switches

- C) Over travel switches
- D) All of these

Ans: D

3560. How many corner switches will be there in an EOT crane in general

- A) 1
- B) 2
- C) 4
- D) 3

Ans: C

3561. If any of the corner switch is operated, then _____

- A) LT operation will be stopped
- B) CT operation will be stopped
- C) Hoist operation will be stopped
- D) All operations of the crane will be stopped

Ans: D

3562. The safety device which is used to limit the upward movement of the hoist operation is

- A) Rotary switch
- B) Gravity switch
- C) All of the above
- D) None of the above

Ans: C

3563. When the gravity switch is operated

- A) Hoist operation will be stopped
- B) All operations will be stopped
- C) LT operation will be stopped
- D) None of the above

Ans: B

3564. Which of the following act as a secondary safety device

- A) Gravity switch
- B) Rotary switch
- C) Over travel switches
- D) Corner switches

Ans: A

3565. All the safety devices of the EOT cranes are controlled by

- A) Protective panel
- B) Auxiliary Hoist panel
- C) Main Hoist panel
- D) Rectifier panel

Ans: A

3566. Rectangular magnet is used in

- A) Axle forge shop
- B) Machine shop
- C) Assembly shop
- D) None of these

Ans: A

3567. The capacity of rectangular magnets in the axle forge shop is

- A) 1kw
- B) 2kw
- C) 3kw
- D) 5kw

Ans: B

3568. Capacity of circular magnets in the SPC bay is

- A) 15kw
- B) 18.5kw
- C) 20kw
- D) 22.5kw

Ans: B

3569. Circular magnets are used for

- A) Lifting hot axles from the furnace discharge area
- B) Loading and unloading of blooms
- C) Both A and B
- D) Lifting of Scraps

Ans: D

3570. Rectangular magnets are used for

- A) Lifting hot axles from the furnace discharge area
- B) Loading and unloading of blooms
- C) Both A and B
- D) Lifting of Scraps

Ans: C

3571. Capacity of battery bank in the Forge shop cranes are

- A) 110V
- B) 220V
- C) 400V
- D) None of the above

Ans: A

3572. Capacity of battery bank in the SPC bay cranes are

- A) 110V
- B) 220V
- C) 400V

D) None of the above

Ans: B

3573. Periodical maintenance of EOT cranes are carried out

A) monthly

B) quarterly

C) half yearly

D) All of the above

Ans: D

3574. Recommended duty cycle of motors used in the EOT cranes are

A) S1

B) S4

C) Any of these

D) None of these

Ans: B

3575. How many LT motors are there in each 15/2 T cranes of Axle shop?

A) 1

B) 2

C) 3

D) 4

Ans: D

3576. 41. How many LT motors are there in the 5T EOT cranes of Axle shop?

A) 1

B) 2

C) 3

D) 4

Ans: B

3577. What is the capacity of LT motors in the Forge shop EOT cranes?

A) 5.5 kw

B) 9.3kw

C) 7.5kw

D) 15kw

Ans: B

3578. What is the capacity of CT motors in the Forge shop EOT cranes?

A) 5.5kw

B) 9.3kw

C) 7.5kw

D) 15kw

Ans: A

3579. What is the full form of DSL in EOT cranes

- A) Duct system line
- B) Down supply lead
- C) Digital subscriber line
- D) Direct supply line

Ans: B

3580. Type of motor starter used in the EOT cranes is

- A) DOL
- B) Star delta
- C) VFD
- D) None of the above

Ans: VFD

3581. Full form of DBR in EOT cranes

- A) Dynamic braking recorder
- B) Drive braking resistance
- C) Diminishing brake resistance
- D) None of the above

Ans: B

3582. Panel used for charging of batteries of EOT crane is known as

- A) Magnet panel
- B) Hoist panel
- C) Rectifier panel
- D) Protective panel

Ans: C

3583. Full form of VFD is

- A) Voltage Frequency drive
- B) Variable frequency drive
- C) Variable fraction drive
- D) Voltage fixed drive

Ans: B

3584. Which of the following is a best practice for operating a crane?

- A) Conducting a pre shift inspection
- B) Speeding up operations to save time
- C) Ignoring hand signals if they seem unclear
- D) Operating the crane at the maximum capacity for efficiency

Ans: A

3585. Supply to the brake thrusters of an EOT crane is

- A) 415 VAC
- B) 220VAC

C) 110VAC
D) 110VDC
Ans: A

c) Basic Protection for Motors

3586. **The main function of a fuse is to**
(a) protect the line
(b) open the circuit
(c) protect the appliance
(d) prevent excessive currents

Ans: d

3587. **On which of the following routine tests are conducted ?**
(a) Oil circuit breakers
(b) Air blast circuit breakers
(c) Minimum oil circuit breakers
(d) All of the above

Ans: d

3588. **SF₆ gas**
(a) is yellow in colour
(b) is lighter than air
(c) is nontoxic
(d) has pungent smell

Ans: c

3589. **The arcing contacts in a circuit breaker are made of**
(a) copper tungsten alloy
(b) porcelain
(c) electrolytic copper
(d) aluminium alloy

Ans: a

3590. **Which of the following medium is employed for extinction of arc in air circuit breaker ?**
(a) Water
(b) Oil
(c) Air
(d) SF₆

Ans: c

3591. **With which of the following, a circuit breaker must be equipped for remote operation ?**
(a) Inverse time trip
(b) Time-delay trip

- (c) Shunt trip
- (d) None of the above

Ans: c

3592. Fault diverters are basically

- (a) fuses
- (b) relays
- (c) fast switches
- (d) circuit breakers

Ans: c

3593. A thermal protection switch can protect against

- (a) short-circuit
- (b) temperature
- (c) overload
- (d) over voltage

Ans: c

3594. Arc in a circuit behaves as

- (a) a capacitive reactance
- (b) an inductive reactance
- (c) a resistance increasing with voltage rise across the arc
- (d) a resistance decreasing with voltage rise across the arc

Ans: d

3595. Thermal circuit breaker has

- (a) delayed trip action
- (b) instantaneous trip action
- (c) both of the above
- (d) none of the above

Ans: a

3596. Relays can be designed to respond to changes in

- (a) resistance, reactance or impedance
- (b) voltage and current
- (c) temperature
- (d) all above

Ans: d

3597. Overload relays are of..... type.

- (a) induction
- (b) thermal
- (c) electromagnetic

(d) all above

Ans: d

3598. **Thermal overload relays are used to protect the motor against over current due to**

- (a) short-circuits
- (b) heavy loads
- (c) grounds
- (d) all of the above

Ans: b

3599. **Magnetic circuit breaker has _____ trip action.**

- (a) delayed
- (b) instantaneous
- (c) both of the above
- (d) none of the above

Ans: b

3600. **D.C. shunt relays are made of**

- (a) few turns of thin wire
- (b) few turns of thick wire
- (c) many turns of thin wire
- (d) many turns of thick wire

Ans: c

3601. **The relay operating speed depends upon**

- (a) the spring tension
- (b) the rate of flux built up
- (c) armature core air gap
- (d) all of the above

Ans: d

3602. **In order that current should flow without causing excessive heating or voltage drop, the relay contacts should**

- (a) have low contact resistance
- (b) be clean and smooth
- (c) be of sufficient size and proper shape
- (d) have all above properties

Ans: d

3603. **Circuit breakers usually operate under**

- (a) transient state of short-circuit current
- (b) sub-transient state of short-circuit current
- (c) steady state of short-circuit current
- (d) after D.C. component has ceased

Ans: a

3604. **Circuit breakers are essentially**

- (a) current carrying contacts called electrodes
- (b) arc extinguishers
- (c) circuits to break the system
- (d) transformers to isolate the two systems

Ans: a

3605. **The current zero interruption, in oil and air blast circuit breakers, is achieved by**

- (a) lengthening of the gap
- (b) cooling and blast effect
- (c) both (a) and (b)
- (d) deionizing the oil with forced air

Ans: c

3606. **Air blast circuit breaker is used for**

- (a) over currents
- (b) short duty
- (c) intermittent duty
- (d) repeated duty

Ans: d

3607. **An efficient and a well designed protective relaying should have**

- (a) good selectivity and reliability
- (b) economy and simplicity
- (c) high speed and selectivity
- (d) all of the above

Ans: d

3608. **Burden of a protective relay is the power**

- (a) required to operate the circuit breaker
- (b) absorbed by the circuit of relay
- (c) developed by the relay circuit
- (d) none of the above

Ans: b

3609. **Directional relays are based on flow of**

- (a) power
- (b) current
- (c) voltage wave
- (d) all of the above

Ans: a

3610. **A differential relay measures the vector difference between**

- (a) two currents
- (b) two voltages
- (c) two or more similar electrical quantities
- (d) none of the above

Ans: c

3611. **A transmission line is protected by**

- (a) inrush protection
- (b) distance protection
- (c) time graded and current graded over current protection
- (d) both (b) and (c)

Ans: d

3612. **Large internal faults are protected by**

- (a) merz price percentage differential protection
- (b) mho and ohm relays
- (c) horn gaps and temperature relays
- (d) earth fault and positive sequence relays

Ans: a

3613. **When a transmission line is energized, the wave that propagates on it is**

- (a) current wave only
- (b) voltage wave only
- (c) both (a) and (b)
- (d) power factor wave only

Ans: c

3614. **Protective relays are devices that detect abnormal conditions in electrical circuits by measuring**

- (a) current during abnormal condition
- (b) voltage during abnormal condition
- (c) constantly the electrical quantities which differ during normal and abnormal conditions
- (d) none of the above

Ans: c

3615. **The voltage appearing across the contacts after opening of the circuit breaker is called _____ voltage.**

- (a) recovery
- (b) surge
- (c) operating
- (d) arc

Ans: a

3616. **Ionization in circuit breaker is facilitated by**

- (a) high temperature
- (b) increase of mean free path
- (c) increasing field strength
- (d) all of the above

Ans: d

3617. **Overheating of relay contacts or contact born out is due to**

- (a) slow making and breaking of load circuit contacts
- (b) foreign matter on the contact surface
- (c) too low contact pressure
- (d) all of the above

Ans: d

3618. **Interruption of large currents by relay requires**

- (a) arc suppressing blow out coils
- (b) wide separation of the opened contacts
- (c) high speed opening of contacts
- (d) all of the above

Ans: d

3619. **Shunt capacitance is neglected while considering**

- (a) short transmission line
- (b) medium transmission line
- (c) long transmission line
- (d) medium and long transmission lines

Ans: a

3620. **The arc voltage produced in A.C. circuit breaker is always**

- (a) in phase with the arc current
- (b) lagging the arc current by 90°
- (c) leading the arc current by 90°
- (d) none of the above

Ans: a

3621. **The time of closing the cycle, in modern circuit breakers is**

- (a) 0.003 sec
- (b) 0.001 sec
- (c) 0.01 sec
- (d) 0.10 sec

Ans: a

3622. **Insulation resistance of high voltage circuit breakers is more than**

- (a) 1 mega ohms
- (b) 10 mega ohms
- (c) 100 mega ohms

(d) 500 mega ohms

Ans: c

3623. **H.R.C. fuses provide best protection against**

- (a) overload
- (b) reverse current
- (c) open-circuits
- (d) short-circuits

Ans: d

3624. **The ground wire should not be smaller than No _____ copper.**

- (a) 2
- (b) 4
- (c) 6
- (d) 10

Ans: d

3625. **The delay fuses are used for the protection of _____ .**

- (a) motors
- (b) power outlet circuits
- (c) fluorescent lamps
- (d) light circuits

Ans: a

3626. **Which of the following is the least expensive protection for overcurrent is low voltage system ?**

- (a) Rewireable fuse
- (b) Isolator
- (c) Oil circuit breaker
- (d) Air break circuit breaker

Ans: a

3627. **Resistance grounding is used for voltage between**

- (a) 33kV to 66kV
- (b) HkV to 33kV
- (c) 3.3kV and 11kV
- (d) none of the above

Ans: c

3628. **The contacts of high voltage switches used in power system are submerged in oil. The main purpose of the oil is to**

- (a) lubricate the contacts
- (b) insulate the contacts from switch body
- (c) extinguish the arc
- (d) all of the above

Ans: c

3629. To protect most of the electrical equipment handling low power, the types of relays used are

- (a) thermocouple
- (b) electronic and bimetallic
- (c) both (a) and (b)
- (d) none of the above

Ans: c

3630. Wave trap is used to trap waves of

- (a) power frequencies
- (b) higher frequencies entering generator or transformer units
- (c) either of the above
- (d) none of the above

Ans: b

3631. Ungrounded neutral transmission system is not recommended because of system

- (a) insulation being overstressed due to over voltages
- (b) insulation overstress may lead to failure and subsequent phase to phase faults
- (c) being inadequately protected against ground fault
- (d) all of the above

Ans: d

3632. The reflection co-efficient at the open circuited end of a transmission line.

- (a) zero
- (b) infinity
- (c) unity
- (d) none of the above

Ans: c

3633. For the protection of power station buildings against direct strokes the requirements are

- (a) interception
- (b) interception and conduction
- (c) interception, conduction and dissipation
- (d) interception, conduction, dissipation and reflection

Ans: c

3634. The line insulation is the insulation level of the station equipment.

- (a) less than
- (b) more than
- (c) proportional to
- (d) not directly related with

Ans: d

3635. The interaction between a transmission line and communication line is minimized by

- (a) transposing transmission as well as communication lines
- (b) increasing the height of the transmission line tower
- (c) increasing the distance between the two lines
- (d) all of the above

Ans: d

3636. **When a wave propagates on a transmission line, it suffers reflection several times at**

- (a) tapping
- (b) load end
- (c) sending end
- (d) sending and other end

Ans: d

3637. **Which of the following statements is incorrect?**

- (a) Station batteries are used to operate relay only
- (b) The lightning arresters are basically surge diverters
- (c) An impedance relay has maximum fault current when fault occurs near the relay
- (d) A high speed relay has an operation of 1 to 2 cycles

Ans: a

3638. **55. Discrimination between main and back up protection is provided by the use of relays which are**

- (a) fast
- (b) sensitive
- (c) slow
- (d) none of the above

Ans: c

3639. **56. Induction cup relay is operated due to changes in**

- (a) current
- (b) voltage
- (c) impedance
- (d) all of the above

Ans: d

3640. **57. A.C. network analyser is used to solve problems of**

- (a) load flow
- (b) load flow and short-circuit
- (c) load flow and stability
- (d) load flow, short-circuit and stability

Ans: d

3641. **58. Which of the following statements is incorrect ?**

- (a) Lightning arrestors are used before the switchgear
- (b) Shunt reactors are used as compensation reactors
- (c) The peak short current is $(1.8 \times \sqrt{2})$ times the A.C. component

(d) The MVA at fault is equal to base MVA divided by per unit equivalent fault reactance

Ans: a

3642. **59. Short-circuit currents are due to**

- (a) single phase to ground faults
- (b) phase to phase faults
- (c) two phase to ground faults
- (d) any of these

Ans: d

3643. **60. To reduce short circuit fault currents are used.**

- (a) reactors
- (b) resistors
- (c) capacitors
- (d) none of the above

Ans: a

3644. **61. Bus coupler is very essential in arrangement**

- (a) single bus
- (b) double bus, double breaker
- (c) main and transfer bus
- (d) all of the above

Ans: c

3645. **62. For cost and safety, the outdoor substations are installed for voltages above**

- (a) 11 kV
- (b) 33 kV
- (c) 60kV
- (d) 110kV

Ans: b

3646. **63. The short circuit in any winding of the transformer is the result of**

- (a) mechanical vibration
- (b) insulation failure
- (c) loose connection
- (d) impulse voltage

Ans: d

3647. **64. relays are used for phase faults on long line.**

- (a) Impedance
- (b) Reactance
- (c) Either of the above
- (d) None of the above

Ans: a

3648. **65. For which of the following protection from negative sequence currents is provided ?**

- (a) Generators
- (b) Motors
- (c) Transmission line
- (d) Transformers

Ans: a

3649. **66. relay is preferred for phase fault on short transmission line.**

- (a) Induction type
- (b) Reactance
- (c) Impedance
- (d) None of the above

Ans: b

3650. **67. Distance relays are generally**

- (a) split-phase relays
- (b) reactance relays
- (c) impedance relays
- (d) none of the above

Ans: d

3651. **68. For which of the following ratings of the transformer differential protection is recommended ?**

- (a) above 30 kVA.
- (b) equal to and above 5 MVA
- (c) equal to and above 25 MVA
- (d) none of the above

Ans: b

3652. **69. A _____ is used to measure the stator % winding temperature of the generator.**

- (a) thermocouple
- (b) pyrometer
- (c) resistance thermometer
- (d) thermometer

Ans: c

3653. **70. The under voltage relay can be used for**

- (a) generators
- (b) busbars
- (c) transformers
- (d) all of the above

Ans: d

3654. **71. The relay with inverse time characteristic will operate within**

- (a) 1.5 sec
- (b) 5 to 10 sec
- (c) 5 to 20 sec
- (d) 20 to 30 sec

Ans: b

3655. **72. The single phasing relays are used for the protection of**

- (a) single phase motors only
- (b) two phase motors only
- (c) two single phase motors running in parallel
- (d) three phase motors

Ans: d

3656. **73. Which of the following devices will receive voltage surge first travelling on the transmission line ?**

- (a) Lightning arresters
- (b) Relays
- (c) Step-down transformer
- (d) Switchgear

Ans: a

3657. **74. Which of the following parameter can be neglected for a short line ?**

- (a) Inductance
- (b) Capacitance
- (c) Resistance
- (d) Reactance

Ans: b

3658. **75. Series reactors should have**

- (a) low resistance
- (b) high resistance
- (c) low impedance
- (d) high impedance

Ans: a

3659. **76. Which of the following circuit breakers has high reliability and minimum maintenance ?**

- (a) Air blast circuit breakers
- (b) Circuit breaker with SF6 gas
- (c) Vacuum circuit breakers
- (d) Oil circuit breakers

Ans: b

3660. **77. Arc in a circuit breaker is interrupted at**

- (a) zero current
- (b) maximum current
- (c) minimum voltage
- (d) maximum voltage

Ans: a

3661. **78. transmission line has reflection coefficient as one.**

- (a) Open circuit
- (b) Short-circuit
- (c) Long
- (d) None of the above

Ans: a

3662. **79. What will be the reflection co-efficient of the wave of load connected to transmission line if surge impedance of the line is equal to load ?**

- (a) Zero
- (b) Unity
- (c) Infinity
- (d) None of the above

Ans: a

3663. **80. The inverse definite mean time relays are used for over current and earth fault protection of transformer against**

- (a) heavy loads

- (b) internal short-circuits
- (c) external short-circuits
- (d) all of the above

Ans: b

3664. **81. Over voltage protection is recommended for**

- (a) hydro-electric generators
- (b) steam turbine generators
- (c) gas turbine generators
- (d) all of the above

Ans: d

3665. **82. Air blast circuit breakers for 400 kV power system are designed to operate in**

- (a) 100 microsecond
- (b) 50 millisecond
- (c) 0.5 sec
- (d) 0.1 sec

Ans: b

3666. **83. Overfluxing protection is recommended for**

- (a) distribution transformer
- (b) generator transformer of the power plant
- (c) auto-transformer of the power plant
- (d) station transformer of the power plant

Ans: b

3667. **84. Series capacitors are used to**

- (a) compensate for line inductive reactance
- (b) compensate for line capacitive reactance
- (c) improve line voltage
- (d) none of the above

Ans: a

3668. **85. Admittance relay is _____ relay.**

- (a) impedance
- (b) directional
- (c) non-directional
- (d) none of the above

Ans: b

3669. **86. The material used for fuse must have**

- (a) low melting point and high specific resistance
- (b) low melting point and -low specific resistance
- (c) high melting point and low specific resistance
- (d) low melting point and any specific resistance

Ans: a

3670. **87. If the fault occurs near the impedance relay, the VII ratio will be**

- (a) constant for all distances
- (b) lower than that of if fault occurs away from the relay
- (c) higher than that of if fault occurs away from the relay

(d) none of the above

Ans: b

3671. **88. The torque produced in induction type relay (shaded pole structure) is**

- (a) inversely proportional to the current
- (b) inversely proportional to the square of the current
- (c) proportional to the current
- (d) proportional to square of the current

Ans: b

3672. **89. The steady state stability of the power system can be increased by**

- (a) connecting lines in parallel
- (b) connecting lines in series
- (c) using machines of high impedance
- (d) reducing the excitation of machines

Ans: a

3673. **90. The inductive interference between power and communication line can be minimized by**

- (a) transposition of the power line
- (b) transposition of the communication line
- (c) both (a) and (b)
- (d) increasing the distance between the conductors

Ans: c

3674. **91. The power loss is an important factor for the design of**

- (a) transmission line
- (b) motor
- (c) generator
- (d) feeder

Ans: a

3675. **92. A fuse is connected**

- (a) in series with circuit
- (b) in parallel with circuit
- (c) either in series or in parallel with circuit
- (d) none of the above

Ans: a

3676. **93. H.R.C. fuse, as compared to a rewirable fuse, has**

- (a) no ageing effect
- (b) high speed of operation
- (c) high rupturing capacity
- (d) all of the above

Ans: d

3677. **94. The fuse rating is expressed in terms of**

- (a) current
- (b) voltage
- (c) VAR
- (d) kVA

Ans: a

3678. **95. The fuse blows off by**

- (a) burning
- (b) arcing
- (c) melting
- (d) none of the above

Ans: c

3679. **96. On which of the following effects of electric current a fuse operates ?**

- (a) Photoelectric effect
- (b) Electrostatic effect
- (c) Heating effect
- (d) Magnetic effect

Ans: c

3680. **97. An isolator is installed**

- (a) to operate the relay of circuit breaker
- (b) as a substitute for circuit breaker
- (c) always independent of the position of circuit breaker
- (d) generally on both sides of a circuit breaker

Ans: d

3681. **98. A fuse in a motor circuit provides protection against**

- (a) overload
- (b) short-circuit and overload
- (c) open circuit, short-circuit and overload
- (d) none of the above

Ans: b

3682. **99. Protection by fuses is generally not used beyond**

- (a) 20 A
- (b) 50 A
- (c) 100 A
- (d) 200 A

Ans: c

3683. **100. A fuse is never inserted in**

- (a) neutral wire
- (b) negative of D.C. circuit
- (c) positive of D.C. circuit
- (d) phase line

Ans: a

3684. **101. Oil switches are employed for**

- (a) low currents circuits
- (b) low voltages circuits
- (c) high voltages and large currents circuits
- (d) all circuits

Ans: c

3685. **102. A switchgear is device used for**

- (a) interrupting an electrical circuit
- (b) switching an electrical circuit
- (c) switching and controlling an electrical circuit

(d) switching, controlling and protecting the electrical circuit and equipment

Ans: d

3686. **103. The fuse wire, in D.C. circuits, is inserted in**

- (a) negative circuit only
- (b) positive circuit only
- (c) both (a) and (b)
- (d) either (a) or (b)

Ans: c

3687. **104. By which of the following methods major portion of the heat generated in a H.R.C. fuse is dissipated ?**

- (a) Radiation
- (b) Convection
- (c) Conduction
- (d) All of the above

Ans: c

3688. **105. A short-circuit is identified by**

- (a) no current flow
- (b) heavy current flow
- (c) voltage drop
- (d) voltage rise

Ans: b

3689. **106. The information to the circuit breaker under fault conditions is provided by**

- (a) relay
- (b) rewirable fuse
- (c) H.R.C. only
- (d) all of the above

Ans: a

3690. **107. To limit short-circuit current in a power system are used.**

- (a) earth wires
- (b) isolators
- (c) H.R.C. fuses
- (d) reactors

Ans: d

3691. **109. A balanced 3-phase system consists of**

- (a) zero sequence currents only
- (b) positive sequence currents only
- (c) negative and zero sequence currents
- (d) zero, negative and positive sequence currents

Ans: b

3692. **110. In a single bus-bar system there will be complete shut down when**

- (a) fault occurs on the bus itself
- (b) fault occurs on neutral line
- (c) two or more faults occur simultaneously
- (d) fault occurs with respect to earthing

Ans: a

d) Pouring System -

3693. 1. What is the main purpose of the pouring system in RWF?

- A) To cool the wheels
- B) To transfer molten metal into molds
- C) To measure wheel diameter
- D) To clean the furnace

Correct Answer: B

3694. 2. Which equipment is primarily used to pour molten metal into the wheel molds?

- A) Ladle
- B) Crane
- C) Conveyor belt
- D) Electric arc furnace

Correct Answer: A

3695. 3. The pouring system must ensure:

- A) Slow pouring to avoid mold damage
- B) Rapid pouring for quick cooling
- C) Uniform and controlled flow of molten metal
- D) High pressure pouring

Correct Answer: C

3696. 4. What kind of control is typically used in pouring systems?

- A) Manual only
- B) Automated or semi-automated control
- C) Hydraulic control only
- D) No control required

Correct Answer: B

3697. 5. Which sensor is commonly used to detect the molten metal level during pouring?

- A) Thermocouple
- B) Level sensor or proximity sensor
- C) Pressure sensor
- D) Flowmeter

Correct Answer: B

3698. 6. What is the major risk if the pouring system malfunctions?

- A) Overheating of wheels
- B) Spillage of molten metal causing safety hazards
- C) Excessive cooling
- D) Rust formation

Correct Answer: B

3699. 7. The **tilting ladle** is used to:

- A) Heat the metal
- B) Pour molten metal into molds by controlled tilting
- C) Mix alloy elements
- D) Transport solid wheels

Correct Answer: B

3700. 8. Which of the following is important for the pouring temperature?

- A) It should be higher than the melting point but not excessively high
- B) It should be below melting point

- C) Temperature does not affect pouring
- D) Temperature should always be maximum

Correct Answer: A

3701. **9.** What type of control device might regulate the tilt angle of a ladle?

- A) PID controller
- B) Manual lever only
- C) Thermostat
- D) Pressure gauge

Correct Answer: A

3702. **10.** The pouring system must avoid:

- A) Oxidation of molten metal during transfer
- B) High-speed cooling
- C) Over-pouring into molds
- D) Airflow interruption

Correct Answer: A

3703. **11.** What is a common method to prevent slag inclusion during pouring?

- A) Using a slag trap or filter
- B) Increasing pouring speed
- C) Cooling the molten metal rapidly
- D) Using cold molds

Correct Answer: A

3704. **12.** In RWF, pouring is usually carried out from:

- A) Electric arc furnace directly
- B) Ladle or pouring basin
- C) Cooling beds
- D) Molding boxes

Correct Answer: B

3705. **13.** Which parameter is crucial to control during pouring?

- A) Pouring rate or flow
- B) Wheel speed
- C) Ambient humidity
- D) Fan speed

Correct Answer: A

3706. **14.** What is the purpose of a **refractory lining** in ladles?

- A) Reduce ladle weight
- B) Prevent heat loss and protect ladle shell
- C) Speed up pouring
- D) Lower melting temperature

Correct Answer: B

3707. **15.** How is the pouring rate commonly measured or controlled?

- A) Using flowmeters or tilt angle sensors
- B) By visual inspection only
- C) By counting mold numbers
- D) Using a thermometer

Correct Answer: A

3708. **16.** What is the main role of the **pouring control system**?

- A) To automate the pouring speed and amount of metal
- B) To lubricate molds
- C) To cool the molten metal
- D) To raise the ladle

Correct Answer: A

3709. **17.** Which of these is an important safety consideration during pouring?

- A) Ensuring operator wears protective gear
- B) Avoiding sudden ladle movements
- C) Monitoring furnace temperature
- D) All of the above

Correct Answer: D

3710. **18.** Molten metal pouring should be:

- A) Continuous and steady
- B) Intermittent and fast
- C) Done by manual pouring only
- D) Slow and discontinuous

Correct Answer: A

3711. **19.** What kind of feedback is essential for automated pouring systems?

- A) Temperature and flow rate feedback
- B) Wheel speed feedback
- C) Noise level feedback
- D) Pressure feedback only

Correct Answer: A

3712. **20.** A **block schematic** of a pouring system includes:

- A) Furnace, ladle, molds, sensors, controller, actuator
- B) Cooling fans, conveyors, electric motors
- C) Molds, pumps, pressure gauges
- D) Thermostats and cooling beds only

Correct Answer: A

3713. **21.** Which actuator is used to control the ladle tilt?

- A) Hydraulic cylinder
- B) Electric motor
- C) Pneumatic cylinder
- D) Any of the above depending on system design

Correct Answer: D

3714. **22.** During pouring, maintaining a **laminar flow** is important to:

- A) Minimize turbulence and prevent defects
- B) Increase pouring speed
- C) Cool the molten metal quickly
- D) Mix alloy elements thoroughly

Correct Answer: A

3715. **23.** The **controller** in pouring system receives input from:

- A) Temperature sensors and flow sensors
- B) Fan speed monitors
- C) Weight scales only

D) Pressure switches

Correct Answer: A

3716. **24.** Which of the following can be used to automate pouring systems?

A) Programmable Logic Controllers (PLCs)

B) Manual levers only

C) Pressure sensors alone

D) Analog thermometers only

Correct Answer: A

3717. **25.** Why is **pouring system automation** preferred in RWF?

A) To improve repeatability and safety

B) To reduce labor costs only

C) To eliminate need for molds

D) To speed up cooling

Correct Answer: A

e) Arc Furnaces including Transformers

3718. **Electric Arc Furnace primarily uses which form of energy?**

A. Chemical

B. Mechanical

C. Electrical

D. Nuclear

Answer: C. Electrical

3719. **Which material is commonly melted in an EAF?**

A. Copper

B. Aluminum

C. Steel scrap

D. Lead

Answer: C. Steel scrap

3720. **Electric arc is produced between:**

A. Electrodes and air

B. Electrodes and water

C. Electrodes and metal charge

D. Electrodes and furnace lining

Answer: C. Electrodes and metal charge

3721. **Which type of electrode is commonly used in an EAF?**

A. Copper

B. Graphite

C. Tungsten

D. Carbon steel

Answer: B. Graphite

3722. The arc in an EAF can reach temperatures up to:

- A. 500°C
- B. 1000°C
- C. 2500°C
- D. 4000°C

Answer: C. 2500°C

3723. What is the function of the furnace shell?

- A. Provide insulation
- B. Support the electrodes
- C. Contain the molten metal
- D. Cool the arc

Answer: C. Contain the molten metal

3724. The roof of an EAF is usually made of:

- A. Concrete
- B. Water-cooled panels
- C. Fire bricks
- D. Steel only

Answer: B. Water-cooled panels

3725. The electrodes in an AC EAF are arranged in:

- A. Line
- B. Triangle
- C. Square
- D. Hexagon

Answer: B. Triangle

3726. Which type of EAF is more energy-efficient?

- A. AC EAF
- B. DC EAF
- C. Resistance furnace
- D. Induction furnace

Answer: B. DC EAF

3727. Bottom tapping in EAF helps in:

- A. Faster melting
- B. Reduced electrode consumption
- C. Clean metal tapping
- D. Better arc control

Answer: C. Clean metal tapping

3728. The main power supply in an EAF is regulated by:

- A. Circuit breakers
- B. Transformers
- C. Inverters

D. Capacitors

Answer: B. Transformers

3729. **What is "foamy slag" used for?**

- A. Protect furnace lining
- B. Increase electrode wear
- C. Insulate molten metal
- D. Improve arc stability

Answer: D. Improve arc stability

3730. **In EAF operation, 'hot heel' refers to:**

- A. Preheated scrap
- B. Residual molten metal
- C. Slag carryover
- D. Damaged lining

Answer: B. Residual molten metal

3731. **Which gas is commonly used to stir molten steel in EAF?**

- A. Oxygen
- B. Nitrogen
- C. Argon
- D. Hydrogen

Answer: C. Argon

3732. **Oxygen lancing in EAF is used for:**

- A. Cooling metal
- B. Cutting steel
- C. Decarburization
- D. Increasing arc length

Answer: C. Decarburization

3733. **Which instrument measures the furnace temperature?**

- A. Spectrometer
- B. Thermocouple
- C. Pyrometer
- D. Voltmeter

Answer: B. Thermocouple

3734. **Automatic electrode regulation helps in:**

- A. Cooling the furnace
- B. Balancing slag composition
- C. Maintaining arc stability
- D. Enhancing lining life

Answer: C. Maintaining arc stability

3735. Power factor in EAF operation is generally:

- A. Zero
- B. Negative
- C. Low
- D. High

Answer: C. Low

3736. Which control system is often used in modern EAFs?

- A. Relay logic
- B. PLC
- C. Manual switches
- D. Hydraulic control

Answer: B. PLC

3737. Voltage fluctuations in EAF are due to:

- A. Electrode vibrations
- B. Arc instability
- C. Scrap charging
- D. All of the above

Answer: D. All of the above

3738. Typical energy consumption of EAF per ton of steel:

- A. 100 kWh
- B. 300 kWh
- C. 400 kWh
- D. 600 kWh

Answer: D. 600 kWh

3739. Preheating scrap can:

- A. Reduce cycle time
- B. Increase electrode wear
- C. Waste energy
- D. Cause arc instability

Answer: A. Reduce cycle time

3740. EAF has lower CO₂ emissions compared to:

- A. Induction furnace
- B. Blast furnace
- C. Rotary kiln
- D. Basic oxygen furnace

Answer: B. Blast furnace

3741. What is the primary reason for using high-voltage arcs?

- A. Reduce scrap
- B. Melt faster
- C. Save power

D. Increase slag volume

Answer: B. Melt faster

3742. **How can energy efficiency be improved in EAF?**

A. Use larger transformers

B. Use foamy slag

C. Increase arc length

D. Delay tapping

Answer: B. Use foamy slag

3743. **What causes electrode breakage?**

A. Overheating

B. Poor contact

C. Scrap movement

D. All of the above

Answer: D. All of the above

3744. **Explosion risks in EAF are mainly due to:**

A. Electrode heating

B. Moist scrap

C. Oxygen lancing

D. High voltage

Answer: B. Moist scrap

3745. **Which PPE is mandatory near an operating EAF?**

A. Safety shoes

B. Heat-resistant gloves

C. Face shield

D. All of the above

Answer: D. All of the above

3746. **The water-cooling system in EAF is used for:**

A. Cooling molten metal

B. Cooling roof and panels

C. Cooling transformer

D. All of the above

Answer: B. Cooling roof and panels

3747. **Regular furnace lining inspection helps prevent:**

A. Arc fluctuation

B. Power loss

C. Refractory wear

D. Breakout accidents

Answer: D. Breakout accidents

3748. EAFs produce which of the following emissions?

- A. NO_x
- B. CO
- C. Dust
- D. All of the above

Answer: D. All of the above

3749. Dust from EAFs is collected using:

- A. Cyclones
- B. ESP or bag filters
- C. Settling tanks
- D. Water sprays

Answer: B. ESP or bag filters

3750. Slag produced in EAF is:

- A. Toxic waste
- B. Recyclable
- C. Inert
- D. Only for landfilling

Answer: B. Recyclable

3751. Which of these reduces EAF emissions?

- A. High scrap charge
- B. Foamy slag practice
- C. Graphite electrodes
- D. Low arc voltage

Answer: B. Foamy slag practice

3752. A major environmental concern of EAF dust is presence of:

- A. Aluminum
- B. Mercury
- C. Zinc and lead
- D. Calcium oxide

Answer: C. Zinc and lead

3753. "UHP" in EAF stands for:

- A. Ultra-Heat Production
- B. Ultra-High Power
- C. Under Heat Processing
- D. Uniform Heating Profile

Answer: B. Ultra-High Power

3754. UHP furnaces are capable of melting:

- A. Stainless steel only
- B. Ferrous & non-ferrous metals
- C. High tonnage steel quickly

D. Aluminum alloys

Answer: C. High tonnage steel quickly

3755. Scrap preheating is often done using:

A. Steam

B. Exhaust gases

C. Arc energy

D. Oil burners

Answer: B. Exhaust gases

3756. AI in modern EAF control helps in:

A. Slag removal

B. Predictive maintenance

C. Oxygen control only

D. Charging speed

Answer: B. Predictive maintenance

3757. EAF is preferred in mini-mills due to:

A. Size

B. Flexibility & lower capital cost

C. Faster cooling

D. Higher emissions

Answer: B. Flexibility & lower capital cost

3758. Which type of current is more commonly used in large EAFs today?

A. AC

B. DC

C. Both

D. None

Answer: A. AC

3759. EAF charging can be done using:

A. Overhead crane

B. Conveyor belt

C. Skip hoist

D. All of the above

Answer: D. All of the above

3760. Electrode consumption is typically measured in:

A. Kg/ton of steel

B. Ton/day

C. Volts/hour

D. Kg/m²

Answer: A. Kg/ton of steel

3761. What is tap-to-tap time?

A. Duration to tap molten steel

- B. Total cycle time between heats
 - C. Electrode wear duration
 - D. Slag discharge time
- Answer:** B. Total cycle time between heats

3762. Which is a common alternative to EAF in steelmaking?

- A. Blast furnace + BOF
 - B. Cupola furnace
 - C. Induction furnace
 - D. None
- Answer:** A. Blast furnace + BOF

3763. Which material is not charged into an EAF?

- A. Scrap
 - B. DRI
 - C. Limestone
 - D. Bauxite
- Answer:** D. Bauxite

3764. Which of the following is added to improve slag foaming?

- A. Alumina
 - B. Lime
 - C. Carbon
 - D. Zinc
- Answer:** C. Carbon

3765. The furnace roof in EAF is usually:

- A. Fixed
 - B. Swing-type
 - C. Made of wood
 - D. Stationary
- Answer:** B. Swing-type

3766. What is the main function of an EAF transformer?

- A. Step-up voltage
 - B. Control arc length
 - C. Step-down high voltage to arc voltage
 - D. Supply power to hydraulic system
- Answer:** C. Step-down high voltage to arc voltage

3767. The EAF transformer typically operates at which power range in RWF?

- A. 1–10 MVA
 - B. 10–30 MVA
 - C. 30–200 MVA
 - D. 500–1000 MVA
- Answer:** B. 10–30 MVA

3768. Which type of load does an EAF transformer primarily feed?

- A. Resistive
- B. Inductive
- C. Non-linear and fluctuating
- D. Capacitive

Answer: C. Non-linear and fluctuating

3769. The EAF transformer is classified as a:

- A. Power transformer
- B. Distribution transformer
- C. Furnace transformer
- D. Generator transformer

Answer: C. Furnace transformer

3770. EAF transformers typically step down voltage to a range of:

- A. 11–22 kV
- B. 100–800 V
- C. 1–2 kV
- D. 50–60 V

Answer: B. 100–800 V

3771. The EAF transformer is usually of which type?

- A. Air-cooled dry type
- B. Oil-immersed type
- C. Gas-insulated type
- D. Vacuum-cooled

Answer: B. Oil-immersed type

3772. Tap changers in EAF transformers are used to:

- A. Change primary voltage
- B. Adjust arc length
- C. Regulate secondary voltage
- D. Cool electrodes

Answer: C. Regulate secondary voltage

3773. What kind of tap changer is typically used in EAF transformers?

- A. Off-load tap changer
- B. On-load tap changer (OLTC)
- C. Manual tap changer
- D. Step switch

Answer: B. On-load tap changer (OLTC)

3774. To withstand arc currents, the EAF transformer must be:

- A. Shielded against electromagnetic waves
- B. Designed for short-circuit duty

- C. Insulated with rubber
- D. Grounded directly

Answer: B. Designed for short-circuit duty

3775. What determines the duty cycle of an EAF transformer?

- A. Arc voltage
- B. Arc current
- C. Tap changer position
- D. Furnace melting cycle

Answer: D. Furnace melting cycle

3776. Why do EAF transformers have multiple tap positions?

- A. To match electrode size
- B. To adjust arc length
- C. To provide variable secondary voltages
- D. To reduce arc noise

Answer: C. To provide variable secondary voltages

3777. The time-varying load of an EAF leads to:

- A. Stable voltage
- B. Harmonic generation
- C. Low power factor
- D. Both B and C

Answer: D. Both B and C

3778. Which parameter must be carefully controlled in EAF transformer operation?

- A. Cooling water pH
- B. Voltage regulation
- C. Oil color
- D. Fuse size

Answer: B. Voltage regulation

3779. Transformer impedance is important for:

- A. Efficient tapping
 - B. Limiting short circuit currents
 - C. Boosting arc current
 - D. Reducing harmonics
- Answer:** B. Limiting short circuit currents

3780. Overheating in EAF transformers can be avoided by:

- A. Air vents
 - B. Load cycling
 - C. Cooling systems and sensors
 - D. Arc timing
- Answer:** C. Cooling systems and sensors

3781. EAF transformers typically use which cooling method?

- A. ONAN
- B. ONAF
- C. OFAF
- D. All of the above

Answer: D. All of the above

3782. The temperature of transformer windings is monitored by:

- A. Voltage sensors
- B. RTDs or thermocouples
- C. Tap changers
- D. Amp meters

Answer: B. RTDs or thermocouples

3783. A Buchholz relay protects the transformer from:

- A. Voltage dips
- B. Arc flash
- C. Internal gas formation/faults
- D. Harmonics

Answer: C. Internal gas formation/faults

3784. Pressure relief devices are installed to:

- A. Increase oil pressure
- B. Prevent transformer explosion
- C. Regulate arc pressure
- D. Reduce leakage

Answer: B. Prevent transformer explosion

3785. Over current in EAF transformer is protected using:

- A. OLTC
- B. Differential relay
- C. Lightning arrester
- D. Fuse only

Answer: B. Differential relay

3786. On-load tap changers work under:

- A. No-load
- B. Full-load without power interruption
- C. Arc start only
- D. Pre-melting only

Answer: B. Full-load without power interruption

3787. The purpose of tap changer diverter switch is to:

- A. Control oil flow
- B. Interrupt load current during tap change
- C. Remove harmonics

D. Balance phase voltages

Answer: B. Interrupt load current during tap change

3788. The tap changer is usually located on:

- A. Primary winding
- B. Secondary winding
- C. Ground terminal
- D. Both A and B

Answer: A. Primary winding

3789. Frequent tap changing during operation is due to:

- A. Load variation
- B. Voltage fluctuation
- C. Furnace phase
- D. All of the above

Answer: D. All of the above

3790. Contact wear in tap changers occurs due to:

- A. Oil cooling
- B. Arc quenching
- C. Mechanical switching under load
- D. Short circuit

Answer: C. Mechanical switching under load

3791. EAF transformer operation introduces:

- A. Pure sine wave
- B. Voltage sag
- C. Harmonics and flicker
- D. Resonance

Answer: C. Harmonics and flicker

3792. The presence of harmonics can affect:

- A. Insulation aging
- B. Other equipment
- C. Transformer life
- D. All of the above

Answer: D. All of the above

3793. Flicker in EAF is due to:

- A. Electrode vibration
- B. Arc instability
- C. Transformer tap changing
- D. Oil contamination

Answer: B. Arc instability

3794. **Harmonics are minimized by using:**

- A. OLTC
- B. Capacitor banks
- C. Harmonic filters
- D. Neutral grounding

Answer: C. Harmonic filters

3795. **Power factor correction in EAF is often achieved using:**

- A. Resistors
- B. Reactors
- C. Capacitors
- D. OLTC

Answer: C. Capacitors

3796. **EAF transformer rating is given in:**

- A. Amperes
- B. Volts
- C. MVA
- D. kW

Answer: C. MVA

3797. **The formula for transformer impedance (%) is:**

- A. $(I_{\text{secondary}} / I_{\text{primary}}) \times 100$
- B. $(Z_{\text{actual}} / Z_{\text{base}}) \times 100$
- C. $(R \times X) \times 100$
- D. $(V \times I) \times 100$

Answer: B. $(Z_{\text{actual}} / Z_{\text{base}}) \times 100$

3798. **Higher impedance in transformer results in:**

- A. Higher fault current
- B. Lower short circuit current
- C. Lower voltage
- D. Arc loss

Answer: B. Lower short circuit current

3799. **Transformer efficiency is affected most by:**

- A. Core loss
- B. Copper loss
- C. Load profile
- D. All of the above

Answer: D. All of the above

3800. **Transformer vector group for EAF is usually:**

- A. Yyn
- B. Dyn
- C. Dd0

D. Yy0

Answer: B. Dyn

3801. **DGA in EAF transformers detects:**

- A. Dust accumulation
- B. Harmonic content
- C. Gas formation from faults
- D. Tap changer speed

Answer: C. Gas formation from faults

3802. **Which gas in DGA indicates overheating?**

- A. Oxygen
- B. Hydrogen
- C. Acetylene
- D. Carbon monoxide

Answer: D. Carbon monoxide

3803. **Partial discharge indicates:**

- A. Core movement
- B. Arc flash
- C. Insulation degradation
- D. Tank rupture

Answer: C. Insulation degradation

3804. **Infrared thermography helps identify:**

- A. Oil leaks
- B. Hot spots
- C. Tap change speed
- D. Flicker

Answer: B. Hot spots

3805. **Which test is performed annually for insulation health?**

- A. Megger test
- B. Load test
- C. Harmonic test
- D. Tap ratio test

Answer: A. Megger test

3806. **Which standard covers EAF transformers?**

- A. IEC 60076
- B. IEEE 1584
- C. ISO 9001
- D. ASME B31

Answer: A. IEC 60076

3807. **Routine oil test includes checking:**

- A. Water content

- B. Dielectric strength
 - C. Acidity
 - D. All of the above
- Answer:** D. All of the above

3808. Scheduled maintenance of OLTC includes:

- A. Arc detection
 - B. Contact resistance check
 - C. Buchholz testing
 - D. Vibration test
- Answer:** B. Contact resistance check

3809. Oil in EAF transformer serves as:

- A. Conductor
 - B. Insulation and cooling medium
 - C. Fuel
 - D. Tap changer lubricant
- Answer:** B. Insulation and cooling medium

3810. Excessive vibration in transformer may be due to:

- A. Harmonics
 - B. Loose core
 - C. Overload
 - D. All of the above
- Answer:** D. All of the above

3811. Digital monitoring systems in EAF transformers can track:

- A. Load current
 - B. Tap position
 - C. Winding temperature
 - D. All of the above
- Answer:** D. All of the above

3812. Smart transformers in EAFs are capable of:

- A. Self-tapping
 - B. Automatic diagnostics
 - C. Eliminating arc
 - D. Operating without oil
- Answer:** B. Automatic diagnostics

3813. Use of high-speed OLTC improves:

- A. Arc stability
 - B. Oil cooling
 - C. Load shedding
 - D. Core saturation
- Answer:** A. Arc stability

3814. **One challenge of EAF transformer design is:**

- A. Low voltage
- B. Thermal shock
- C. Uniform loading
- D. Constant duty cycle

Answer: B. Thermal shock

3815. **The end-of-life criteria for an EAF transformer include:**

- A. Core shift
- B. Excessive gas generation
- C. High winding resistance
- D. All of the above

Answer: D. All of the above

SECTION - D

a) HT and LT Layout of MRS, Ring Main System

a) HT and LT Layout of MRS

3816. What does HT stand for in the context of electrical power distribution?

- A) High Technology
- B) High Tension
- C) High Transmission
- D) High Tracing

Answer: B) High Tension

3817. What is the main function of the Main Receiving Station (MRS) in Rail Wheel Factory?

- A) To distribute electricity to sub-stations
- B) To transform high voltage to low voltage for machinery
- C) To store electricity for future use
- D) To monitor the power quality

Answer: A) To distribute electricity to sub-stations & B) To transform high voltage to low voltage for machinery

3818. What is the typical voltage range for HT incoming feeders in a Rail Wheel Factory?

- A) 110V to 230V
- B) 415V to 660V
- C) 11kV to 33kV
- D) 400kV to 600kV

Answer: C) 11kV to 33kV

3819. The high-tension side of the transformer steps down the voltage from:

- A) 440V to 110V
- B) 11kV/33kV to 415V/660V
- C) 380V to 220V
- D) 660V to 110V

Answer: B) 11kV/33kV to 415V/660V

3820. What is the typical voltage for low-tension (LT) systems in industrial settings like the Rail Wheel Factory?

- A) 11kV
- B) 33kV
- C) 415V/660V
- D) 1000V

Answer: C) 415V/660V

3821. Which of the following is used for switching and protecting circuits in the HT system of an MRS?

- A) Circuit Breaker
- B) Transformer
- C) Fuse
- D) Isolation switch

Answer: A) Circuit Breaker

3822. What is the purpose of the step-down transformer in the MRS?

- A) To convert AC to DC
- B) To increase the voltage for transmission
- C) To reduce the voltage to a usable level for machinery
- D) To regulate the power factor

Answer: C) To reduce the voltage to a usable level for machinery

3823. In an electrical distribution system, what does the 'busbar' do?

- A) Directly converts electrical power
- B) Provides a physical path for current flow and connects circuits
- C) Protects circuits from overload
- D) Stores excess power for later use

Answer: B) Provides a physical path for current flow and connects circuits

3824. What protection device is commonly used to protect electrical circuits from overcurrent on the HT side?

- A) Fuse
- B) Overload Relay
- C) Circuit Breaker
- D) Earth Leakage Relay

Answer: C) Circuit Breaker

3825. What is the purpose of earthing in an electrical system?

- A) To prevent excessive voltage rise
- B) To protect equipment from lightning
- C) To ensure the safety of personnel by providing a safe path for fault current
- D) To reduce power loss

Answer: C) To ensure the safety of personnel by providing a safe path for fault current

3826. What is the primary function of the MCC (Motor Control Center) in a Rail Wheel Factory's electrical system?

- A) To control the speed of motors
- B) To monitor the voltage level
- C) To distribute power to machines
- D) To store electrical power

Answer: A) To control the speed of motors

3827. Which of the following is essential to prevent damage to electrical equipment in the event of a fault?

- A) Surge Protection
- B) Switchgear
- C) Transformer
- D) All of the above

Answer: D) All of the above

3828. The electrical system of a Rail Wheel Factory is usually grounded through:

- A) A copper rod or plate in the ground
- B) A resistance wire in the power line
- C) A transformer connection
- D) All of the above

Answer: A) A copper rod or plate in the ground

3829. What is the function of a surge protector in an electrical system?

- A) To store electrical power
- B) To protect sensitive electrical components from voltage spikes
- C) To regulate voltage
- D) To increase current flow

Answer: B) To protect sensitive electrical components from voltage spikes

3830. Which of the following protection devices is used to detect earth leakage faults?

- A) Earth Leakage Relay (ELR)
- B) Overcurrent Relay
- C) Circuit Breaker
- D) Fuse

Answer: A) Earth Leakage Relay (ELR)

3831. Which of the following is typically used to control the voltage level in an HT distribution system?

- A) Transformer
- B) Breaker Panel
- C) Capacitor Bank
- D) Automatic Voltage Regulator (AVR)

Answer: A) Transformer

3832. HT panel in an MRS usually contains:

- A) Overload relays
- B) Circuit breakers
- C) Isolators
- D) All of the above

Answer: D) All of the above

3833. What kind of electrical motor is typically used in heavy machinery in a Rail Wheel Factory?

- A) Induction motor
- B) Synchronous motor
- C) DC motor
- D) Stepper motor

Answer: A) Induction motor

3834. Which protection device is used to disconnect the power supply to motors in the event of an overload?

- A) Circuit Breaker
- B) Thermal Overload Relay
- C) Surge Protector
- D) Earth Fault Relay

Answer: B) Thermal Overload Relay

3835. What is the primary purpose of an earth fault relay in the electrical system of a factory?

- A) To regulate voltage
- B) To disconnect power in case of a fault between phase and earth
- C) To prevent overcurrent
- D) To measure the frequency of electrical signals

Answer: B) To disconnect power in case of a fault between phase and earth

3836. Which type of motor starter is used for motors requiring a high inrush current?

- A) Star-Delta Starter
- B) Auto Transformer Starter
- C) Direct-On-Line Starter
- D) A & B

Answer: D) A & B

3837. What is the function of an Automatic Voltage Regulator (AVR)?

- A) To maintain a constant voltage level across electrical equipment
- B) To protect against short circuits
- C) To convert AC to DC
- D) To provide surge protection

Answer: A) To maintain a constant voltage level across electrical equipment

3838. The power factor correction is typically done using:

- A) Capacitor Banks
- B) Transformers
- C) Inductive Loads
- D) Rectifiers

Answer: A) Capacitor Banks

3839. What is the maximum voltage level that the LT distribution system typically handles in a Rail Wheel Factory?

- A) 220V
- B) 415V
- C) 660V
- D) 1000V

Answer: B) 415V

3840. What type of earthing system is typically used in large industrial plants like Rail Wheel Factories?

- A) Solid Earthing
- B) Neutral Earthing
- C) Grounding Through Resistance
- D) Both A and B

Answer: D) Both A and B

3841. What is the primary function of an isolation switch in an electrical system?

- A) To measure the current
- B) To connect and disconnect power circuits for maintenance
- C) To control the motor speed
- D) To distribute electrical power

Answer: B) To connect and disconnect power circuits for maintenance

3842. Which electrical protection device would you use to protect a motor from damage due to excessive current?

- A) Earth Fault Relay
- B) Thermal Overload Relay
- C) Circuit Breaker
- D) Fuse

Answer: B) Thermal Overload Relay

3843. In the context of the HT and LT systems in the MRS, what does the term 'busbar' refer to?

- A) A safety relay
- B) A conductor that connects different electrical circuits
- C) A switchgear device
- D) A type of transformer

Answer: B) A conductor that connects different electrical circuits

3844. What is the most common method of power factor correction in industrial setups?

- A) Using a DC generator
- B) Installing capacitor banks
- C) Using synchronous motors
- D) All of the above

Answer: B) Installing capacitor banks

3845. The protective devices in an electrical distribution system are designed to:

- A) Increase the voltage
- B) Prevent overheating of machinery
- C) Disconnect circuits during faults
- D) Increase the efficiency of transformers

Answer: C) Disconnect circuits during faults

b) Protection and controls used for DG Set

3846. What is the primary purpose of a Diesel Generator (DG) set in a Rail Wheel Factory (RWF)?

- A) To power the factory's lighting system
- B) To provide emergency backup power during grid failure
- C) To reduce energy consumption
- D) To cool down electrical equipment

Answer: B) To provide emergency backup power during grid failure

3847. Which protection device is commonly used to prevent overcurrent in the DG set circuit?

- A) Earth Fault Relay
- B) Overcurrent Relay
- C) Differential Protection Relay
- D) Under-voltage Relay

Answer: B) Overcurrent Relay

3848. What is the function of the overload relay in a DG set?

- A) To regulate the voltage
- B) To protect the generator from exceeding safe operating current limits

- C) To detect low fuel levels
- D) To control the engine speed

Answer: B) To protect the generator from exceeding safe operating current limit

3849. Which device is used for controlling the voltage output of a DG set?

- A) Voltage Regulator
- B) Earth Fault Relay
- C) Overcurrent Relay
- D) Surge Protector

Answer: A) Voltage Regulator

3850. What is the purpose of a coolant temperature sensor in a DG set?

- A) To monitor the fuel efficiency
- B) To prevent overheating by monitoring the engine coolant temperature
- C) To ensure smooth engine operation
- D) To regulate engine speed

Answer: B) To prevent overheating by monitoring the engine coolant temperature

3851. Which of the following is typically used to protect a DG set from short circuits?

- A) Earth Fault Relay
- B) Circuit Breaker
- C) Differential Protection
- D) Isolation Transformer

Answer: B) Circuit Breaker

3852. What is the purpose of a speed governor in a DG set?

- A) To maintain the engine speed at a constant level under varying load conditions
- B) To regulate the fuel flow to the engine
- C) To reduce emissions
- D) To monitor the exhaust gas temperature

Answer: A) To maintain the engine speed at a constant level under varying load conditions

3853. In a DG set, automatic voltage regulation (AVR) helps to:

- A) Automatically start the engine
- B) Regulate the generator's output voltage
- C) Control the fuel injectors
- D) Increase the engine power

Answer: B) Regulate the generator's output voltage

3854. What protection is typically used in DG sets to prevent overvoltage?

- A) Overcurrent Relay
- B) Overvoltage Relay
- C) Under-voltage Relay

D) Low Power Factor Relay
Answer: B) Overvoltage Relay

3855. Which type of control system is commonly used to start and stop a DG set automatically based on power failure?

- A) Manual Control System
- B) Automatic Transfer Switch (ATS)
- C) PLC-based control system
- D) Local On/Off Switch

Answer: B) Automatic Transfer Switch (ATS)

3856. What is the role of the Automatic Transfer Switch (ATS) in DG set operation?

- A) To maintain constant power output
- B) To automatically switch between mains and DG set power during a power failure
- C) To control the fuel intake to the DG set
- D) To monitor exhaust emissions

Answer: B) To automatically switch between mains and DG set power during a power failure

3857. What is the function of a fuel level sensor in a DG set?

- A) To monitor fuel consumption
- B) To measure the fuel temperature
- C) To alert operators when the fuel tank is running low
- D) To control the fuel injection timing

Answer: C) To alert operators when the fuel tank is running low

3858. Which protection device is used to prevent low oil pressure in a DG set?

- A) Low Oil Pressure Switch
- B) Overcurrent Relay
- C) Voltage Regulator
- D) High Temperature Shutdown

Answer: A) Low Oil Pressure Switch

3859. What type of protection is used to prevent overheating of the DG engine?

- A) High Temperature Shutdown
 - B) Voltage Regulator
 - C) Load Shedding
 - D) Overvoltage Relay
- Answer: A) High Temperature Shutdown

3860. Which type of control system is responsible for regulating the speed of a DG engine?

- A) Fuel Flow Control
- B) Load Control System
- C) Speed Governor
- D) Voltage Regulation Control

Answer: C) Speed Governor

3861. In the context of a DG set, what does the term "load sharing" refer to?

- A) Balancing the load between the generator and the utility supply
 - B) Distributing the power equally across multiple generators
 - C) The process of controlling fuel consumption
 - D) The regulation of the engine's cooling system
- Answer: B) Distributing the power equally across multiple generators

3862. Which protection device is used to detect a phase failure in a DG set?

- A) Phase Failure Relay
 - B) Overload Relay
 - C) Low Voltage Relay
 - D) Earth Fault Relay
- Answer: A) Phase Failure Relay

3863. What is the function of a battery charger in a DG set?

- A) To charge the battery that powers the DG set's starting system
 - B) To provide power to the control system
 - C) To ensure voltage regulation
 - D) To monitor the fuel level in the tank
- Answer: A) To charge the battery that powers the DG set's starting system

3864. Which relay is used for earth fault protection in DG sets?

- A) Earth Fault Relay
 - B) Overcurrent Relay
 - C) Phase Sequence Relay
 - D) Differential Protection Relay
- Answer: A) Earth Fault Relay

3865. What is the key function of a cooling fan in a DG set?

- A) To increase fuel efficiency
 - B) To cool the engine and prevent overheating
 - C) To monitor the exhaust gases
 - D) To supply air for combustion
- Answer: B) To cool the engine and prevent overheating

3866. What type of protection would be used in a DG set to prevent dry running of the engine?

- A) Low fuel level alarm
 - B) Low water level protection
 - C) Low oil pressure switch
 - D) Both B and C
- Answer: D) Both B and C

3867. What is typically used to monitor the exhaust temperature of a DG set?

- A) Exhaust Gas Temperature Sensor
- B) Oil Pressure Switch
- C) Speed Governor
- D) Load Controller

Answer: A) Exhaust Gas Temperature Sensor

3868. In a DG set, automatic shutdown is triggered in case of:

- A) Low voltage output
- B) High temperature or low oil pressure
- C) Overload condition
- D) All of the above

Answer: D) All of the above

3869. What is the main purpose of Differential Protection in DG sets?

- A) To protect the engine from high temperatures
- B) To detect faults between phases or between phase and ground
- C) To maintain engine speed
- D) To regulate voltage output

Answer: B) To detect faults between phases or between phase and ground

3870. What kind of system is used for remote monitoring and control of DG sets?

- A) PLC-based control system
- B) Manual control system
- C) SCADA system
- D) Direct voltage control system

Answer: C) SCADA system

3871. Which of the following is NOT a feature of the Automatic Transfer Switch (ATS)?

- A) Automatic switching between DG set and utility supply
- B) Protection against electrical faults
- C) Control over the voltage regulation of the DG set
- D) Manual operation only

Answer: D) Manual operation only

3872. Which device is used to monitor the fuel consumption of a DG set?

- A) Fuel Gauge
- B) Load Bank
- C) Fuel Flow Meter
- D) Fuel Pressure Switch

Answer: C) Fuel Flow Meter

3873. Which of the following is part of the generator protection system for detecting faults?

- A) Generator Excitation System
- B) Generator Protection Relay
- C) Fuel Injection System
- D) Alternator Controller

Answer: B) Generator Protection Relay

3874. What type of protection device is used to prevent reverse power flow in DG sets?

- A) Reverse Power Relay
- B) Earth Fault Relay
- C) Overcurrent Relay
- D) Under-frequency Relay

Answer: A) Reverse Power Relay

3875. Which of the following is used for fuel system control in a DG set?

- A) Fuel Injection Pump
- B) Fuel Pressure Regulator
- C) Diesel Tank Valve
- D) All of the above

Answer: D) All of the above

3876. Which is not a common maintenance hazard with cranes

- A) Damage to wire rope
- B) Alignment Issues
- C) Bent/ damaged hooks
- D) Chipped Paint

Ans: D

3877. An overhead crane that consist of parallel runways with a travelling bridge is known as

- A) Road mobile Crane
- B) Monorail Crane
- C) Bridge crane
- D) Jib crane

Ans: C

3878. Type of crane where a horizontal beam extends to lift and move a load along the beam is known as

- A) Gantry Crane
- B) Monorail Crane
- C) Bridge crane
- D) Jib crane

Ans: D

3879. A crane that is shut down for various reasons should be

- A) Sold out
- B) Kept Open
- C) Locked out and tagged out
- D) Painted black

Ans: C

3880. Preventive maintenance is

- A) Maintenance carried out before an issue is identified
- B) Maintenance carried out after an issue is identified
- C) Maintenance carried out after an accident
- D) None of the above

Ans: A

3881. What is full form of L.T pertaining to EOT cranes?

- A) Limited travel
- B) Longitudinal travel
- C) Long travel
- D) Lengthy travel

Ans: B

3882. What is full form of C.T pertaining to EOT cranes?

- A) Complete travel
- B) Common travel
- C) Cross travel
- D) Close travel

Ans: C

3883. What is the full form of M.H pertaining to EOT cranes?

- A) Material Handling
- B) Mini Hoist
- C) Main Hoist
- D) Main Handle

Ans: C

3884. What is full form of A.H pertaining to EOT cranes?

- A) Additional Handle
- B) Auxiliary Hoist
- C) Additional Hoist
- D) None of the above

Ans: B

3885. Hand signal during operations are used when

- A) the operator is deaf
- B) voice communications can not be heard
- C) rigger is dumb

D) none of the above

Ans: B

3886. _____ is used to douze general fire

A) Fire extinguisher

B) Life guard

C) Alcohol

D) Air blowing

Ans: A

3887. Crane driver should accept emergency stop from

A) Only rigger engaged with his crane

B) all riggers at site

C) anybody working at site

D) Only his supervisor

Ans: C

3888. At a time crane driver should accept signals from

A) Only rigger engaged with his crane

B) all riggers at site

C) anybody working at site

D) Only his supervisor

Ans: A

3889. Total number of EOT cranes in the Axle Forge shop is

A) 2

B) 4

C) 5

D) 3

Ans: C

3890. Total number of EOT cranes in the Axle machine shop is

A) 2

B) 4

C) 3

D) 5

Ans: B

3891. Total number of EOT cranes in the Axle Assembly Bay is

A) 1

B) 2

C) 3

D) 4

Ans: D

3892. Total number of EOT cranes in the Wheelset loading Bay is

A) 2

- B) 3
 - C) 4
 - D) 5
- Ans: B

3893. Total number of EOT cranes in the SPC Bay is

- A) 2
 - B) 3
 - C) 4
 - D) 5
- Ans: C

3894. Axle Shop Control is carrying out the electrical maintenance activities of _____ number of cranes in RWF

- A) 13
 - B) 16
 - C) 20
 - D) 21
- Ans: C

3895. 10 Ton capacity crane is used in which area of the Axle shop?

- A) Forge Shop
 - B) Machine Shop
 - C) Assembly Shop
 - D) None of the above
- Ans: B

3896. All the Assembly shop cranes are of

- A) 10T
 - B) 5T
 - C) 15T
 - D) 3T
- Ans: B

3897. Capacity of Axle forge shop cranes is

- A) 5T
 - B) 10T
 - C) 15T
 - D) 20T
- Ans: C

3898. Maximum used Auxiliary hoist capacity of EOT cranes in Axle shop is

- A) 2T
- B) 3T
- C) 5T
- D) None of the above

Ans: D

3899. The safety devices of EOT cranes include

- A) Anti Collision device
- B) Rotary switches
- C) Over travel switches
- D) All of these

Ans: D

3900. How many corner switches will be there in an EOT crane in general

- A) 1
- B) 2
- C) 4
- D) 3

Ans: C

3901. If any of the corner switch is operated, then _____

- A) LT operation will be stopped
- B) CT operation will be stopped
- C) Hoist operation will be stopped
- D) All operations of the crane will be stopped

Ans: D

3902. The safety device which is used to limit the upward movement of the hoist operation is

- A) Rotary switch
- B) Gravity switch
- C) All of the above
- D) None of the above

Ans: C

3903. When the gravity switch is operated

- A) Hoist operation will be stopped
- B) All operations will be stopped
- C) LT operation will be stopped
- D) None of the above

Ans: B

3904. Which of the following act as a secondary safety device

- A) Gravity switch
- B) Rotary switch
- C) Over travel switches
- D) Corner switches

Ans: A

3905. All the safety devices of the EOT cranes are controlled by

- A) Protective panel
- B) Auxiliary Hoist panel
- C) Main Hoist panel
- D) Rectifier panel

Ans: A

3906. Rectangular magnet is used in

- A) Axle forge shop
- B) Machine shop
- C) Assembly shop
- D) None of these

Ans: A

3907. The capacity of rectangular magnets in the axle forge shop is

- A) 1kw
- B) 2kw
- C) 3kw
- D) 5kw

Ans: B

3908. Capacity of circular magnets in the SPC bay is

- A) 15kw
- B) 18.5kw
- C) 20kw
- D) 22.5kw

Ans: B

3909. Circular magnets are used for

- A) Lifting hot axles from the furnace discharge area
- B) Loading and unloading of blooms
- C) Both A and B
- D) Lifting of Scraps

Ans: D

3910. Rectangular magnets are used for

- A) Lifting hot axles from the furnace discharge area
- B) Loading and unloading of blooms
- C) Both A and B
- D) Lifting of Scraps

Ans: C

3911. Capacity of battery bank in the Forge shop cranes are

- A) 110V
- B) 220V
- C) 400V
- D) None of the above

Ans: A

3912. Capacity of battery bank in the SPC bay cranes are

- A) 110V
- B) 220V
- C) 400V
- D) None of the above

Ans: B

3913. Periodical maintenance of EOT cranes are carried out

- A) monthly
- B) quarterly
- C) half yearly
- D) All of the above

Ans: D

3914. Recommended duty cycle of motors used in the EOT cranes are

- A) S1
- B) S4
- C) Any of these
- D) None of these

Ans: B

3915. How many LT motors are there in each 15/2 T cranes of Axle shop?

- A) 1
- B) 2
- C) 3
- D) 4

Ans: D

3916. 41. How many LT motors are there in the 5T EOT cranes of Axle shop?

- A) 1
- B) 2
- C) 3
- D) 4

Ans: B

3917. What is the capacity of LT motors in the Forge shop EOT cranes?

- A) 5.5 kw
- B) 9.3kw
- C) 7.5kw
- D) 15kw

Ans: B

3918. What is the capacity of CT motors in the Forge shop EOT cranes?

- A) 5.5kw
 - B) 9.3kw
 - C) 7.5kw
 - D) 15kw
- Ans: A

3919. What is the full form of DSL in EOT cranes

- A) Duct system line
- B) Down supply lead
- C) Digital subscriber line
- D) Direct supply line

Ans: B

3920. Type of motor starter used in the EOT cranes is

- A) DOL
- B) Star delta
- C) VFD
- D) None of the above

Ans: VFD

3921. Full form of DBR in EOT cranes

- A) Dynamic braking recorder
- B) Drive braking resistance
- C) Diminishing brake resistance
- D) None of the above

Ans: B

3922. Panel used for charging of batteries of EOT crane is known as

- A) Magnet panel
- B) Hoist panel
- C) Rectifier panel
- D) Protective panel

Ans: C

3923. Full form of VFD is

- A) Voltage Frequency drive
- B) Variable frequency drive
- C) Variable fraction drive
- D) Voltage fixed drive

Ans: B

3924. Which of the following is a best practice for operating a crane?

- A) Conducting a pre shift inspection
- B) Speeding up operations to save time
- C) Ignoring hand signals if they seem unclear

D) Operating the crane at the maximum capacity for efficiency
Ans: A

3925. Supply to the break thrusters of an EOT crane is
A) 415 VAC
B) 220VAC
C) 110VAC
D) 110VDC
Ans: A

c) Single Line Diagram of Ring Main System

3926. What is the primary advantage of a Ring Main System in an industrial electrical distribution network?
A) Higher reliability of power supply
B) Easy installation
C) Low operational cost
D) Simple to maintain

Answer: A) Higher reliability of power supply

3927. In a Ring Main System, what happens if one part of the ring is disconnected?
A) The power supply to the entire system is lost
B) The system continues to operate through the other path of the ring
C) Power is transferred to backup sources
D) Only the connected portion of the system loses power

Answer: B) The system continues to operate through the other path of the ring

3928. Which of the following is a key feature of the Ring Main System?
A) It has no redundancy
B) It has multiple paths for power supply
C) It uses only one supply source
D) It requires only manual switching

Answer: B) It has multiple paths for power supply

3929. The Ring Main System is typically used for:
A) Low voltage distribution only
B) High voltage transmission
C) Industrial power distribution
D) Power generation

Answer: C) Industrial power distribution

3930. Which of the following components is used to isolate sections of the Ring Main System for maintenance?
A) Busbars
B) Circuit breakers
C) Fuses
D) Isolators

Answer: D) Isolators

3931. In a Ring Main System, what is the role of the automatic changeover switch?

- A) To connect the ring to the power grid
- B) To ensure that power is supplied from an alternative path in case of failure
- C) To control the voltage
- D) To monitor the current flow

Answer: B) To ensure that power is supplied from an alternative path in case of failure

3932. What type of protection is usually used in the Ring Main System to prevent overloads?

- A) Earth leakage relay
- B) Overcurrent protection relay
- C) Differential protection relay
- D) Under-voltage relay

Answer: B) Overcurrent protection relay

3933. Which of the following is a common application of the Ring Main System in an industrial setting?

- A) Emergency power supply systems
- B) Uninterruptible power supply (UPS)
- C) High-precision manufacturing equipment
- D) General industrial electrical distribution

Answer: D) General industrial electrical distribution

3934. How does the Ring Main System maintain continuous power supply even during faults?

- A) By switching to a backup generator
- B) By using parallel paths for power distribution
- C) By reducing the load on the system
- D) By increasing the voltage levels

Answer: B) By using parallel paths for power distribution

3935. What is the primary function of circuit breakers in a Ring Main System?

- A) To regulate voltage
- B) To disconnect faulty sections
- C) To provide power to all sections
- D) To monitor the temperature

Answer: B) To disconnect faulty sections

3936. In a typical Ring Main System, where is the main transformer usually located?

- A) At the starting point of the ring
- B) In the middle of the ring
- C) At the end of the ring depending on the design
- D) At any point along the ring,

Answer: A) At the starting point of the ring

3937. In the Ring Main System, how is load sharing typically handled between parallel circuits?

- A) Manual switching
- B) Automatic load balancing
- C) Overload detection
- D) By using transformers

Answer: B) Automatic load balancing

3938. Which of the following ensures that the electrical system is always balanced in a Ring Main configuration?

- A) Voltage regulators
- B) Circuit breakers
- C) Transformers
- D) Proper load distribution

Answer: D) Proper load distribution

3939. What is the role of busbars in a Ring Main System?

- A) To provide a path for current from multiple sources to load
- B) To isolate faulty circuits
- C) To measure power consumption
- D) To reduce energy loss

Answer: A) To provide a path for current from multiple sources to load

3940. What is one of the most common faults that the Ring Main System is designed to handle?

- A) Short-circuit faults
- B) Transformer failure
- C) Voltage surge
- D) Overload conditions

Answer: A) Short-circuit faults

3941. What kind of protection system is used to detect faults in a Ring Main System before they cause significant damage?

- A) Overcurrent protection
- B) Differential protection
- C) Short-circuit protection
- D) All of the above

Answer: D) All of the above

3942. In a Ring Main System, what type of relay is used to detect faults between phases?

- A) Overload relay
- B) Earth fault relay
- C) Differential protection relay
- D) Phase-failure relay

Answer: C) Differential protection relay

3943. What would happen if an overcurrent condition occurs in a Ring Main System without proper protection?

- A) The circuit would continue to operate normally
- B) The system would trip automatically to avoid damage

- C) The power supply would shut down for all connected loads
- D) The load would automatically reduce

Answer: B) The system would trip automatically to avoid damage

3944. In the event of a fault, which device is typically responsible for isolating the faulty section in a Ring Main System?
- A) Load Break Switch
 - B) Overcurrent Relay
 - C) Circuit Breaker
 - D) Voltage Transformer

Answer: C) Circuit Breaker

3945. What is a key feature of Ring Main Units (RMU) in the Ring Main System?
- A) They control the entire factory's power distribution
 - B) They provide automatic fault isolation
 - C) They reduce the need for circuit breakers
 - D) They act as transformers

Answer: B) They provide automatic fault isolation

3946. Which of the following is essential for maintaining the safety and reliability of a Ring Main System?
- A) Regular maintenance and testing
 - B) Overloading of the system
 - C) Increasing the system's voltage
 - D) Ensuring that the system is under-loaded

Answer: A) Regular maintenance and testing

3947. What is the benefit of having a Ring Main System in terms of fault tolerance?
- A) It reduces the total cost of installation
 - B) It allows for simultaneous power supply to all sections
 - C) It ensures that the system remains operational even if one path is faulty
 - D) It allows only one path for power distribution

Answer: C) It ensures that the system remains operational even if one path is faulty

3948. What is the standard protection device used in Ring Main Systems for detecting earth faults?
- A) Earth Fault Relay
 - B) Current Transformer
 - C) Fuse
 - D) Surge Protector

Answer: A) Earth Fault Relay

3949. In an industrial environment, the Ring Main System is designed to be:
A) Single-path B) Dual-path for redundancy C) Manual switching only D) Non-interruptible

Answer: B) Dual-path for redundancy

3950. Which of the following is the best practice for improving the reliability of the Ring Main System?

- A) Limit the number of branches in the ring
- B) Use manual switches for maintenance
- C) Ensure automatic load balancing and fault detection
- D) Increase the load on the system to maximize efficiency

Answer: C) Ensure automatic load balancing and fault detection

3951. The main disadvantage of a Ring Main System is:

- A) High operational cost
- B) Difficulty in fault isolation
- C) Complexity in design and installation
- D) Increased downtime in case of fault

Answer: C) Complexity in design and installation

3952. What is the purpose of fuses in a Ring Main System?

- A) To increase power supply reliability
- B) To protect the system from overcurrent and short-circuit faults
- C) To provide energy savings
- D) To monitor the power quality

Answer: B) To protect the system from overcurrent and short-circuit faults

3953. In the Ring Main System, if one section of the ring is disconnected, what happens?

- A) The entire system shuts down
- B) The rest of the ring continues to function normally through an alternate path
- C) The power supply switches to backup generators
- D) Only the disconnected section loses power

Answer: B) The rest of the ring continues to function normally through an alternate path

3954. The main advantage of automatic changeover switches in a Ring Main System is:

- A) Preventing voltage fluctuations
- B) Ensuring continuous power supply during faults
- C) Monitoring current levels
- D) Reducing power consumption

Answer: B) Ensuring continuous power supply during faults

3955. Which protection device in the Ring Main System is used to monitor and disconnect faulty sections due to overload?

- A) Earth Fault Relay
- B) Overload Relay
- C) Differential Relay
- D) Voltage Regulator

Answer: B) Overload Relay

d) Pumps, Lifts, Lightings and Air Conditioning

3956. In a refrigeration cycle, the flow of refrigerant is controlled by

- (a) Compressor
- (b) Condenser
- (c) Evaporator
- (d) Expansion valve

Ans: (d)

3957. The colour of the flame of halide torch, in case of leakage of Freon refrigerant, will change to

- (a) Bright green
- (b) Yellow
- (c) Red
- (d) Orange

Ans: (a)

3958. For air conditioning the operation theatre in a hospital, the percentage of outside air in the air supplied is

- (a) Zero
- (b) 20
- (c) 50
- (d) 100

Ans: (d)

3959. In vapour compression cycle using NH_3 as refrigerant, initial charge is filled at

- (a) Suction of compressor
- (b) Delivery of compressor
- (c) High pressure side close to receiver
- (d) Low pressure side near receiver

Ans: (c)

3960. The temperature of air recorded by a thermometer, when it is not affected by the moisture present in the air, is called

- (a) Wet bulb temperature
- (b) Dry bulb temperature
- (c) Dew point temperature
- (d) None of these

Ans: (b)

3961. Absorption system normally uses the following refrigerant

- (a) Freon - 11
- (b) Freon - 22
- (c) CO₂
- (d) Ammonia

Ans: (d)

3962. Which of the following statement is correct?

- (a) In vapour absorption refrigerator, the compression of refrigerant is avoided.
- (b) Sub-cooling can be achieved by circulating more quantity of cooling water through the condenser.
- (c) In vapour compression refrigeration, the vapour is drawn in the compressor cylinder during its suction stroke and is compressed adiabatically during the compression stroke.
- (d) All of the above

Ans: (d)

3963. Allowable pressure on high pressure side or ammonia absorption system is of the order of

- (a) Atmospheric pressure
- (b) Slightly above atmospheric pressure
- (c) 24 bars
- (d) 56 bars

Ans: (d)

3964. The C.O.P. of a Carnot refrigerator in winter will be _____ as compared to C.O.P. in summer.

- (a) Same
- (b) Lower
- (c) Higher
- (d) None of these

Ans: (c)

3965. Chaperon equation is a relation between

- (a) Temperature, pressure and enthalpy
- (b) Specific volume and enthalpy
- (c) Temperature and enthalpy
- (d) Temperature, pressure, specific volume and enthalpy

Ans: (d)

3966. During humidification process, _____ increases.

- (a) Wet bulb temperature
- (b) Relative humidity
- (c) Dry bulb temperature

(d) Specific humidity

Ans: (b)

3967. Where does the lowest temperature occur in a vapour compression cycle?

- (a) Condenser
- (b) Evaporator
- (c) Compressor
- (d) Expansion valve

Ans: (b)

3968. The ratio of actual mass of water vapour in a given volume of moist air to the mass of water vapour in the same volume of saturated air at the same temperature and pressure, is called

- (a) Humidity ratio
- (b) Relative humidity
- (c) Absolute humidity
- (d) Degree of saturation

Ans: (b)

3969. Under cooling in a refrigeration cycle

- (a) Increases C.O.P
- (b) Decreases C.O.P
- (c) C.O.P remains unaltered
- (d) Other factors decide C.O.P

Ans: (a)

3970. In a domestic vapour compression refrigerator, the refrigerant commonly used is

- (a) CO_2
- (b) Ammonia
- (c) R-12
- (d) All of these

Ans: (c)

3971. The COP of a vapour compression plant in comparison to vapour absorption plant is

- (a) More
- (b) Less
- (c) Same
- (d) More/less depending on size of plant

Ans: (a)

3972. The fluids used in Electrolux refrigerator are

- (a) Water and hydrogen
- (b) Ammonia and hydrogen
- (c) Ammonia, water and hydrogen
- (d) None of these

Ans: (c)

3973. Domestic refrigerator working on vapour compression cycle uses the following type of expansion device

- (a) Electrically operated throttling valve
- (b) Manually operated valve
- (c) Thermostatic valve
- (d) Capillary tube

Ans: (d)

3974. The condition of refrigerant after passing through the expansion or throttle valve, in a vapour compression system is

- (a) High pressure saturated liquid
- (b) Wet vapour
- (c) Very wet vapour
- (d) Dry vapour

Ans: (c)

3975. An important characteristic of absorption system of refrigeration is

- (a) Noisy operation
- (b) Quiet operation
- (c) Cooling below 0°C
- (d) Very little power consumption

Ans: (b)

3976. The centrifugal compressors are generally used for refrigerants that require

- (a) Small displacements and low condensing pressures
- (b) Large displacements and high condensing pressures
- (c) Small displacements and high condensing pressures
- (d) Large displacements and low condensing pressures

Ans: (d)

3977. Pick up the incorrect statement

- (a) Lithium bromide used in vapour absorption cycle is non volatile
- (b) Lithium bromide plant can't operate below 0°C
- (c) A separator is used in lithium bromide plant to remove the unwanted water vapour by condensing
- (d) Concentration of solution coming out of lithium bromide generator is more in comparison to that entering the generator

Ans: (c)

3978. During dehumidification process, the relative humidity

- (a) Remains constant
- (b) Increases
- (c) Decreases

(d) None of these

Ans: (c)

3979. The refrigerant widely used in domestic refrigerators is

- (a) Ammonia
- (b) Carbon dioxide
- (c) Sulphur dioxide
- (d) R-12

Ans: (d)

3980. The moisture in a refrigerant is removed by

- (a) Evaporator
- (b) Safety relief valve
- (c) Dehumidifier
- (d) Driers

Ans: (d)

3981. During sensible cooling of air _____ decreases.

- (a) Wet bulb temperature
- (b) Relative humidity
- (c) Dry bulb temperature
- (d) Specific humidity

Ans: (c)

3982. At lower temperatures and pressures, the latent heat of vaporisation of a refrigerant

- (a) Decreases
- (b) Increases
- (c) Remain same
- (d) Depends on other factors

Ans: (b)

3983. The wet bulb depression is zero when relative humidity is

- (a) Zero
- (b) 0.5
- (c) 0.75
- (d) 1.0

Ans: (d)

3984. The C.O.P of a refrigeration cycle with increase in evaporator temperature, keeping condenser temperature constant, will

- (a) Increase
- (b) Decrease
- (c) Remain unaffected
- (d) May increase or decrease depending on the type of refrigerant used

Ans: (a)

3985. During humidification process, dry bulb temperature

- (a) Remains constant
- (b) Increases
- (c) Decreases
- (d) None of these

Ans: (a)

3986. The vapour pressure of refrigerant should be

- (a) Lower than atmospheric pressure
- (b) Higher than atmospheric pressure
- (c) Equal to atmospheric pressure
- (d) Could be anything

Ans: (b)

3987. Which of the following statement is wrong?

- (a) The performance of the vapour compression refrigerator varies considerably with both vaporising and condensing temperatures.
- (b) In vapour compression cycle, the useful part of the heat transfer is at the condenser.
- (c) In ammonia-hydrogen (Electrolux) refrigerator, no compressor, pump or fan is required.
- (d) The effect of under-cooling the liquid refrigerant is to decrease the coefficient of performance.

Ans: (d)

3988. In a vapour compression system, the condition of refrigerant before passing through the condenser is

- (a) Saturated liquid
- (b) Wet vapour
- (c) Dry saturated vapour
- (d) Superheated vapour

Ans: (d)

3989. For proper refrigeration in a cabinet, if the temperature and vapour pressure difference between cabinet and atmosphere is high, then

- (a) Bigger cabinet should be used
- (b) Smaller cabinet should be used
- (c) Perfectly tight vapour seal should be used
- (d) Refrigerant with lower evaporation temperature should be used

Ans: (c)

3990. During sensible heating of air _____ decreases.

- (a) Wet bulb temperature

- (b) Relative humidity
- (c) Dry bulb temperature
- (d) Specific humidity

Ans: (b)

3991. One ton refrigeration corresponds to

- (a) 50 kcal/ min
- (b) 50 kcal/ hr
- (c) 80 kcal/ min
- (d) 80 kcal/ hr

Ans: (a)

3992. The process, generally used in winter air-conditioning to warm and humidity the air, is called

- (a) Humidification
- (b) Dehumidification
- (c) Heating and humidification
- (d) Cooling and dehumidification

Ans: (c)

3993. The leaks in a refrigeration system using Freon are detected by

- (a) Halide torch which on detection produces greenish flame lighting
- (b) Sulphur sticks which on detection gives white smoke
- (c) Using reagents
- (d) Smelling

Ans: (a)

3994. The reduced ambient air cooling system has

- (a) One cooling turbine and one heat exchanger
- (b) One cooling turbine and two heat exchangers
- (c) Two cooling turbines and one heat exchanger
- (d) Two cooling turbines and two heat exchangers

Ans: (c)

3995. In vapour compression cycle, the condition of refrigerant is saturated liquid

- (a) After passing through the condenser
- (b) Before passing through the condenser
- (c) After passing through the expansion throttle valve
- (d) Before entering the expansion valve

Ans: (a)

3996. Which of the following refrigerant has the maximum ozone depletion potential in the stratosphere?

- (a) Ammonia
- (b) Carbon dioxide

- (c) Sulphur dioxide
- (d) Fluorine

Ans: (d)

3997. If the evaporator temperature of a plant is lowered, keeping the condenser temperature constant, the h.p. of compressor required will be

- (a) Same
- (b) More
- (c) Less
- (d) More/less depending on rating

Ans: (b)

3998. Hydrogen is used in Electrolux refrigeration system so as to_____ the rate of evaporation of the liquid ammonia passing through the evaporator.

- (a) Equalise
- (b) Reduce
- (c) Increase
- (d) None of these

Ans: (c)

3999. Pick up the wrong statement. A refrigerant should have

- (a) Tow specific heat of liquid
- (b) High boiling point
- (c) High latent heat of vaporisation
- (d) Higher critical temperature

Ans: (b)

4000. The pressure at the inlet of a refrigerant compressor is called

- (a) Suction pressure
- (b) Discharge pressure
- (c) Critical pressure
- (d) Back pressure

Ans: (a)

4001. Condensing temperature in a refrigerator is the temperature

- (a) Of cooling medium
- (b) Of freezing zone
- (c) Of evaporator
- (d) At which refrigerant gas becomes liquid

Ans: (d)

4002. In aircraft, air refrigeration Cycle is used because of

- (a) Low weight per tonne of refrigeration
- (b) High heat transfer rate

- (c) Low temperature at high altitudes
- (d) Higher coefficient of performance

Ans: (a)

4003. Highest pressure encountered in a refrigeration system should be

- (a) Critical pressure of refrigerant
- (b) Much below critical pressure
- (c) Much above critical pressure
- (d) Near critical pressure

Ans: (b)

4004. The refrigerant used for absorption refrigerators working on heat from solar collectors is a mixture of water and

- (a) Carbon dioxide
- (b) Sulphur dioxide
- (c) Lithium bromide
- (d) R-12

Ans: (c)

4005. One ton of the refrigeration is

- (a) The standard unit used in refrigeration problems
- (b) The cooling effect produced by melting 1 ton of ice
- (c) The refrigeration effect to freeze 1 ton of water at 0°C into ice at 0°C in 24 hours
- (d) The refrigeration effect to produce 1 ton of ice at NTP conditions

Ans: (c)

4006. The dry bulb temperature during sensible heating of air

- (a) Remains constant
- (b) Increases
- (c) Decreases
- (d) None of these

Ans: (b)

4007. Vertical lines on pressure-enthalpy chart show constant

- (a) Pressure lines
- (b) Temperature lines
- (c) Total heat lines
- (d) Entropy lines

Ans: (c)

4008. During heating and dehumidification process, dry bulb temperature

- (a) Remains constant
- (b) Increases
- (c) Decreases
- (d) None of these

Ans: (b)

4009. The evolution of heat of solution takes place in ammonia absorption plant when

- (a) Ammonia vapour goes into solution
- (b) Ammonia vapour is driven out of solution
- (c) Lithium bromide mixes with ammonia
- (d) Weak solution mixes with strong solution

Ans: (a)

4010. In a pressure enthalpy chart, the space to the left of the saturated liquid line represents

- (a) Wet vapour region
- (b) Superheated vapour region
- (c) Sub-cooled liquid region
- (d) None of these

Ans: (c)

4011. In vapour compression cycle, the condition of refrigerant is high pressure saturated liquid

- (a) After passing through the condenser
- (b) Before passing through the condenser
- (c) After passing through the expansion or throttle valve
- (d) Before entering the expansion valve

Ans: (d)

4012. In a bootstrap air evaporative cooling system, the evaporator is provided

- (a) Between the combustion chamber and the first heat exchanger
- (b) Between the first heat exchanger and the secondary compressor
- (c) Between the secondary compressor and the second heat exchanger
- (d) Between the second heat exchanger and the cooling turbine

Ans: (d)

4013. The COP of a domestic refrigerator

- (a) Is less than 1
- (b) Is more than 1
- (c) Is equal to 1
- (d) Depends upon the make

Ans: (b)

4014. The air cooling system mostly used in transport type aircrafts is

- (a) Simple air cooling system
- (b) Simple evaporative air cooling system
- (c) Bootstrap air cooling system
- (d) All of these

Ans: (c)

4015. The higher temperature in vapour compression cycle occurs at

- (a) Receiver
- (b) Expansion valve
- (c) Evaporator
- (d) Compressor discharge

Ans: (d)

4016. Dry bulb temperature is the temperature of air recorded by a thermometer, when

- (a) It is not affected by the moisture present in the air
- (b) Its bulb is surrounded by a wet cloth exposed to the air
- (c) The moisture present in it begins to condense
- (d) None of the above

Ans: (a)

4017. In refrigerators, the temperature difference between the evaporating refrigerant and the medium being cooled should be

- (a) High, of the order of 25°
- (b) As low as possible (3 to 11°C)
- (c) Zero
- (d) Any value

Ans: (b)

4018. The evaporator changes the low pressure liquid refrigerant from the expansion valve into

- (a) High pressure liquid refrigerant
- (b) Low pressure liquid and vapour refrigerant
- (c) Low pressure vapour refrigerant
- (d) None of these

Ans: (c)

4019. Choose the correct statement

- (a) A refrigerant should have low latent heat
- (b) If operating temperature of system is low, then refrigerant with low boiling point should be used
- (c) Pre-cooling and sub-cooling of refrigerant are same
- (d) Superheat and sensible heat of a refrigerant are same

Ans: (b)

4020. Carbon dioxide is

- (a) Colourless
- (b) Odourless
- (c) Non-flammable
- (d) All of these

Ans: (d)

4021. Reducing suction pressure in refrigeration cycle

- (a) Lowers evaporation temperature

- (b) Increases power required per ton of refrigeration
- (c) Lowers compressor capacity because vapour is lighter
- (d) All of the above

Ans: (d)

4022. The coefficient of performance of a domestic refrigerator is_____ as compared to a domestic air-conditioner.

- (a) Same
- (b) Less
- (c) More
- (d) None of these

Ans: (b)

4023. If a gas is to be liquefied, its temperature must be

- (a) Increased to a value above its critical temperature
- (b) Reduced to a value below its critical temperature
- (c) Equal to critical temperature
- (d) None of the above

Ans: (c)

4024. The capacity of a domestic refrigerator is in the range of

- (a) 0.1 to 0.3 TR
- (b) 1 to 3 TR
- (c) 3 to 5 TR
- (d) 5 to 7 TR

Ans: (a)

4025. The lowest thermal diffusivity is of

- (a) Iron
- (b) Lead
- (c) Aluminium
- (d) Rubber

Ans: (d)

4026. In a vapour compression cycle, the refrigerant immediately after expansion valve is

- (a) Liquid
- (b) Sub-cooled liquid
- (c) Saturated liquid
- (d) Wet vapour

Ans: (d)

4027. Which of the following statement is correct for ammonia as a refrigerant?

- (a) It is toxic to mucous membranes.
- (b) It requires large displacement per TR compared to fluoro carbons.
- (c) It reacts with copper and its alloys.

(d) All of these

Ans: (d)

4028. Critical pressure of a liquid is the pressure
- (a) Above which liquid will remain liquid
 - (b) Above which liquid becomes gas
 - (c) Above which liquid becomes vapour
 - (d) Above which liquid becomes solid

Ans: (a)

4029. The optimum effective temperature for human comfort is
- (a) Higher in winter than in summer
 - (b) Lower in winter than in summer
 - (c) Same in winter and summer
 - (d) Not dependent on season

Ans: (b)

4030. Formation of frost on evaporator in refrigerator
- (a) Results in loss of heat due to poor heat transfer
 - (b) Increases heat transfer rate
 - (c) Is immaterial
 - (d) Can be avoided by proper design

Ans: (a)

4031. A one tonne refrigerating machine means that
- (a) One tonne is the total mass of machine
 - (b) One tonne refrigerant is used
 - (c) One tonne of water can be converted into ice
 - (d) One tonne of ice when melts from and at 0° C in 24 hours, the refrigeration effect is Equivalent to 210 kJ/min

Ans: (d)

4032. The suction pipe diameter of refrigerating unit compressor in comparison to delivery side is
- (a) Bigger
 - (b) Smaller
 - (c) Equal
 - (d) Smaller/bigger depending on capacity

Ans: (a)

4033. The coefficient of performance (C.O.P.) of a refrigerator working as a heat pump is given by
- (a) $(C.O.P.)_P = (C.O.P.)_R + 2$
 - (b) $(C.O.P.)_P = (C.O.P.)_R + 1$
 - (c) $(C.O.P.)_P = (C.O.P.)_R - 1$

(d) $(C.O.P)_P = (C.O.P)_R$

Ans: (b)

4034. Presence of moisture in a refrigerant affects the working of

- (a) Compressor
- (b) Condenser
- (c) Evaporator
- (d) Expansion valve

Ans: (d)

4035. During heating and humidification, the final relative humidity of air

- (a) Can be lower or higher than that of the entering air
- (b) Is lower than that of the entering air
- (c) Is higher than that of the entering air
- (d) None of the above

Ans: (a)

4036. Which of the following cycles uses air as the refrigerant?

- (a) Ericson
- (b) Stirling
- (c) Carnot
- (d) Bell Coleman

Ans: (d)

4037. The curved lines on a psychrometric chart indicates

- (a) Dry bulb temperature
- (b) Wet bulb temperature
- (c) Dew point temperature
- (d) Relative humidity

Ans: (d)

4038. On the pressure-enthalpy diagram, condensation and desuperheating is represented by a horizontal line because the process

- (a) Involves no change in volume
- (b) Takes place at constant temperature
- (c) Takes place at constant entropy
- (d) Takes place at constant pressure

Ans: (d)

4039. When the temperature of the surrounding is higher than the temperature of the body, then the heat loss by convection from the body to the surrounding will be

- (a) Positive
- (b) Negative
- (c) Zero

(d) None of these

Ans: (b)

4040. The general rule for rating refrigeration systems (excepting for CO₂ system) is to approximate following h.p. per ton of refrigeration

- (a) 0.1 to 0.5 h.p. per ton of refrigeration
- (b) 0.5 to 0.8 h.p. per ton of refrigeration
- (c) 1 to 2 h.p. per ton of refrigeration
- (d) 2 to 5 h.p. per ton of refrigeration

Ans: (c)

4041. The atmospheric air at dry bulb temperature of 15°C enters a heating coil maintained at 40°C. The air leaves the heating coil at 25°C. The bypass factor of the heating coil is

- (a) 0.376
- (b) 0.4
- (c) 0.6
- (d) 0.67

Ans: (c)

4042. The change in evaporator temperature in a refrigeration cycle, as compared to change in condenser temperature, influences the value of C.O.P.

- (a) More
- (b) Less
- (c) Equally
- (d) Unpredictable

Ans: (a)

4043. Most thermostatic expansion valves are set for a superheat of

- (a) 5°C
- (b) 10°C
- (c) 15°C
- (d) 20°C

Ans: (a)

4044. In a refrigeration system, heat absorbed in comparison to heat rejected is

- (a) More
- (b) Less
- (c) Same
- (d) More for small capacity and less for high capacity

Ans: (b)

4045. A thermostatic expansion valve in a refrigeration system

- (a) Ensures the evaporator completely filled with refrigerant of the load

- (b) Is suitable only for constant load systems
- (c) Maintains different temperatures in evaporator in proportion to load
- (d) None of the above

Ans: (a)

4046. Freon group of refrigerants are

- (a) Inflammable
- (b) Toxic
- (c) Non-inflammable and toxic
- (d) Nontoxic and non-inflammable

Ans: (d)

4047. The boiling point of ammonia is

- (a) -10.5°C
- (b) -30°C
- (c) -33.3°C
- (d) -77.7°C

Ans: (c)

4048. For obtaining high COP, the pressure range of compressor should be

- (a) High
- (b) Low
- (c) Optimum
- (d) Any value

Ans: (b)

4049. A reversible engine has ideal thermal efficiency of 30%. When it is used as a refrigerating machine with all other conditions unchanged, the coefficient of performance will be

- (a) 1.33
- (b) 2.33
- (c) 3.33
- (d) 4.33

Ans: (b)

4050. Cooling water is required for following equipment in ammonia absorption plant

- (a) Condenser
- (b) Evaporator
- (c) Absorber
- (d) Condenser, absorber and separator (rectifier)

Ans: (d)

4051. The freezing point of sulphur dioxide is

- (a) -56.6°C
- (b) -75.2°C

- (c) -77.7°C
- (d) -135.8°C

Ans: (b)

4052. Mass flow ratio of NH_3 in comparison to Freon12 for same refrigeration load and same temperature limits is of the order of

- (a) 1 : 1
- (b) 1 : 9
- (c) 9 : 1
- (d) 1 : 3

Ans: (b)

4053. In a refrigeration system, the expansion device is connected between the

- (a) Compressor and condenser
- (b) Condenser and receiver
- (c) Receiver and evaporator
- (d) Evaporator and compressor

Ans: (c)

4054. The vapour compression refrigerator employs the following cycle

- (a) Rankine
- (b) Carnot
- (c) Reversed Rankine
- (d) Reversed Carnot

Ans: (d)

4055. In actual air-conditioning applications for R-12 and R-22, and operating at a condenser temperature of 40°C and an evaporator temperature of 5°C , the heat rejection factor is About

- (a) 1
- (b) 1.25
- (c) 2.15
- (d) 5.12

Ans: (b)

4056. Low specific speed of a pump implies it is

- (a) Centrifugal pump
- (b) Mixed flow pump
- (c) Axial flow pump
- (d) None of the above

Ans: (a)

4057. Head developed by a centrifugal pump is

- (a) Proportional to diameter of impeller
- (b) Proportional to speed of impeller

- (c) Proportional to diameter and speed of impeller
- (d) None of the above

Ans: (c)

4058. In centrifugal pumps, maximum efficiency is obtained when the blades are

- (a) Straight
- (b) Bent forward
- (c) Bent backward
- (d) Radial

Ans: (c)

4059. Which of the following pump is suitable for small discharge and high heads?

- (a) Centrifugal pump
- (b) Axial flow pump
- (c) Mixed flow pump
- (d) Reciprocating pump

Ans: (d)

4060. For small discharge at high pressure, following pump is preferred

- (a) Centrifugal
- (b) Axial flow
- (c) Mixed flow
- (d) Reciprocating

Ans: (d)

4061. In a single casing, multistage pump running at constant speed, the capacity rating is to be slightly lowered. It can be done by

- (a) Designing new impeller
- (b) Trimming the impeller size to the required size by machining
- (c) Not possible
- (d) Some other alterations in the impeller

Ans: (b)

4062. If a pump is handling water and is discharging a certain flow Q at a constant total dynamic head requiring a definite B.H.P., the same pump when handling a liquid of specific gravity

0.75 and viscosity nearly same as of water, the horse power required will be

- (a) Same
- (b) 0.75 B.H.P.
- (c) B.H.P./0.75
- (d) 1.5 B.H.P.

Ans: (b)

4063. In a centrifugal pump, the liquid enters the pump

- (a) At the top

- (b) At the bottom
- (c) At the center
- (d) From sides

Ans: (c)

4064. For very high discharge at low pressure such as for flood control and irrigation applications, following type of pump is preferred

- (a) Centrifugal
- (b) Axial flow
- (c) Reciprocating
- (d) Mixed flow

Ans: (b)

4065. The specific speed (N_s) of a centrifugal pump is given by

- (a) $(N\sqrt{Q})/H^{2/3}$
- (b) $(N\sqrt{Q})/H^{3/4}$
- (c) $(N\sqrt{Q})/H$
- (d) $(N\sqrt{Q})/H^{5/4}$

Ans: (b)

4066. Air vessels in reciprocating pump are used to

- (a) Smoothen flow
- (b) Reduce acceleration to minimum
- (c) Increase pump efficiency
- (d) Save pump from cavitations

Ans: (b)

4067. If the net positive suction head ($NPSH$) requirement for the pump is not satisfied, then

- (a) No flow will take place
- (b) Cavitation will be formed
- (c) Efficiency will be low
- (d) Excessive power will be consumed

Ans: (b)

4068. Discharge of a centrifugal pump is (where N = Speed of the pump impeller)

- (a) Directly proportional to N
- (b) Inversely proportional to N
- (c) Directly proportional to N^2
- (d) Inversely proportional to N^2

Ans: (a)

4069. Saving of work done and power by fitting an air vessel to single acting reciprocating pump is of the order of

- (a) 39.2
%

- (b) 49.2
%
- (c) 68.8
%
- (d) 84.8
%

Ans:

(d)

4070. Overall efficiency of a centrifugal pump is the ratio of
- (a) Energy available at the impeller to the energy supplied to the pump by the prime mover
 - (b) Actual workdone by the pump to the energy supplied to the pump by the prime mover
 - (c) Energy supplied to the pump to the energy available at the impeller
 - (d) Manometric head to the energy supplied by the impeller per kN of water

Ans: (b)

4071. Which of the following pump is generally used to pump highly viscous fluid?

- (a) Centrifugal pump
- (b) Reciprocating pump
- (c) Air lift pump
- (d) Screw pump

Ans: (d)

4072. In order to avoid cavitation in centrifugal pumps

- (a) The suction pressure should be high
- (b) The delivery pressure should be high
- (c) The suction pressure should be low
- (d) The delivery pressure should be low

Ans: (a)

4073. The centrifugal pump preferred for a specific speed between 80 to 160 r.p.m. is

- (a) Slow speed with radial flow at outlet
- (b) Medium speed with radial flow at outlet
- (c) High speed with radial flow at outlet
- (d) High speed with mixed flow at outlet

Ans: (d)

4074. A centrifugal pump will start delivering liquid only when the pressure rise in the impeller is equal to the

- (a) Kinetic head
- (b) Velocity head
- (c) Manometric head
- (d) Static head

Ans: (c)

4075. The ratio of quantity of liquid discharged per second from the pump to the quantity of liquid passing per second through the impeller is known as

- (a) Manometric efficiency
- (b) Mechanical efficiency
- (c) Overall efficiency
- (d) Volumetric efficiency

Ans: (d)

4076. Discharge (Q) of a centrifugal pump is given by (where D = Diameter of impeller at inlet, b = Width of impeller at inlet, and V_f = Velocity of flow at inlet)

- (a) $Q = \pi.D.V_f$
- (b) $Q = \pi.b.V_f$
- (c) $Q = \pi.D.b.V_f$
- (d) $Q = D.b.V_f$

Ans: (c)

4077. Multistage centrifugal pumps are used to obtain

- (a) High discharge
- (b) High head
- (c) Pumping of viscous fluids
- (d) High head and high discharge

Ans: (b)

4078. Multistage centrifugal pumps are used to

- (a) Give high discharge
- (b) Produce high heads
- (c) Pump viscous fluids
- (d) All of these

Ans: (b)

4079. Reciprocating pumps are no more to be seen in industrial applications (in comparison to centrifugal pumps) because of

- (a) High initial and maintenance cost
- (b) Lower discharge
- (c) Lower speed of operation
- (d) Necessity of air vessel

Ans: (a)

4080. Axial flow pump is started with its delivery valve

- (a) Kept fully closed
- (b) Kept fully open
- (c) Irrespective of any position
- (d) Kept 50% open

Ans: (b)

4081. Head developed by a centrifugal pump depends on

- (a) Impeller diameter
- (b) Speed
- (c) Fluid density
- (d) Both (A) and (B) above

Ans: (d)

4082. Centrifugal pump is started with its delivery valve

- (a) Kept fully closed
- (b) Kept fully open
- (c) Irrespective of any position
- (d) Kept 50% open

Ans: (a)

4083. In a centrifugal pump casing, the flow of water leaving the impeller, is

- (a) Rectilinear flow
- (b) Radial flow
- (c) Free vortex motion
- (d) Forced vortex

Ans: (c)

4084. Which type of the pump is different from others in the same group?

- (a) Screw pump
- (b) Gear pump
- (c) Cam and piston pump
- (d) Plunger pump

Ans: (d)

4085. When a piping system is made up primarily of vertical lift and very little pipe friction, the pump characteristics should be

- (a) Horizontal
- (b) Nearly horizontal
- (c) Steep
- (d) First rise and then fall

Ans: (c)

4086. Power required to drive a centrifugal pump is directly proportional to ____ of its impeller.

- (a) Diameter
- (b) Square of diameter
- (c) Cube of diameter
- (d) Fourth power of diameter

Ans: (d)

4087. Discharge of a centrifugal pump is

- (a) Directly proportional to diameter of its impeller
- (b) Inversely proportional to diameter of its impeller
- (c) Directly proportional to (diameter)² of its impeller
- (d) Inversely proportional to (diameter)² of its impeller

Ans: (d)

4088. Slip of a reciprocating pump is defined as the

- (a) Ratio of actual discharge to the theoretical discharge
- (b) Sum of actual discharge and the theoretical discharge
- (c) Difference of theoretical discharge and the actual discharge
- (d) Product of theoretical discharge and the actual discharge

Ans: (c)

4089. Delivery head of a centrifugal pump is

- (a) Directly proportional to N
- (b) Inversely proportional to N
- (c) Directly proportional to N^2
- (d) Inversely proportional to N^2

Ans: (c)

4090. Theoretical power required (in watts) to drive a reciprocating pump is (where w = Specific weight of liquid to be pumped in N/m³, Q = Discharge of the pump in m³/s, H_s = Suction head in metres, and H_d = Delivery head in metres)

- (a) wQH_s
- (b) wQH_d
- (c) $wQ(H_s - H_d)$
- (d) $wQ(H_s + H_d)$

Ans: (d)

4091. Slip of a reciprocating pump is negative, when

- (a) Suction pipe is short and pump is running at low speeds
- (b) Delivery pipe is long and pump is running at high speeds
- (c) Suction pipe is short and delivery pipe is long and the pump is running at low speeds
- (d) Suction pipe is long and delivery pipe is short and the pump is running at high speeds

Ans: (d)

4092. The static head of a centrifugal pump is equal to the _____ of suction head and delivery head.

- (a) Product
- (b) Difference
- (c) Sum
- (d) None of these

Ans: (c)

4093. Motion of a liquid in a volute casing of a centrifugal pump is an example of

- (a) Rotational flow
- (b) Radial
- (c) Forced spiral vortex flow
- (d) Spiral vortex flow

Ans: (d)

4094. The type of centrifugal pump preferred for a specific speed of 20 r.p.m. is

- (a) Slow speed pump with radial flow at outlet
- (b) Medium speed pump with radial flow at outlet
- (c) High speed pump with radial flow at outlet
- (d) High speed pump with axial flow at outlet

Ans: (a)

4095. Mechanical efficiency of a centrifugal pump is the ratio of

- (a) Energy available at the impeller to the energy supplied to the pump by the prime mover
- (b) Actual workdone by the pump to the energy supplied to the pump by the prime mover
- (c) Energy supplied to the pump to the energy available at the impeller
- (d) Manometric head to the energy supplied by the impeller per kN of water

Ans: (a)

4096. The flow rate in gear pump

- (a) Increases with increase in pressure
- (b) Decreases with increase in pressure
- (c) More or less remains constant with increase in pressure
- (d) Unpredictable

Ans: (c)

4097. Which of the following statement is correct?

- (a) The centrifugal pump is suitable for large discharge and smaller heads.
- (b) The centrifugal pump requires less floor area and simple foundation as compared to reciprocating pump.
- (c) The efficiency of centrifugal pump is less as compared to reciprocating pump.
- (d) All of the above

Ans: (d)

4098. In a centrifugal pump, the regulating valve is provided on the

- (a) Casing
- (b) Delivery pipe
- (c) Suction pipe
- (d) Impeller

Ans: (b)

4099. The impeller of a centrifugal pump may have

- (a) Volute casing
- (b) Volute casing with guide blades
- (C) Vortex casing
- (D) Any one of these

Ans: (d)

4100. Indicator diagram of a reciprocating pump is a graph between

- (a) Flow vs. swept volume
- (b) Pressure in cylinder vs. swept volume
- (c) Flow vs. speed
- (d) Pressure vs. speed

Ans: (b)

4101. One horsepower is equal to

- (a) 102 watts
- (b) 75 watts
- (c) 550 watts
- (d) 735 watts

Ans: (d)

4102. For starting an axial flow pump, its delivery valve should be

- (a) Closed
- (b) Open
- (c) Depends on starting condition and flow desired
- (d) Could be either open or closed

Ans: (b)

4103. Which of the following pump is successfully used for lifting water from deep wells?

- (a) Centrifugal pump
- (b) Reciprocating pump
- (c) Jet pump
- (d) Air lift pump

Ans: (d)

4104. When a piping system is made up primarily of friction head and very little of vertical lift, then pump characteristics should be

- (a) Horizontal
- (b) Nearly horizontal
- (c) Steep
- (d) First rise and then fall

Ans: (b)

4105. Casting of a centrifugal pump is designed so as to minimize

- (a) Friction loss
- (b) Cavitations
- (c) Static head
- (d) Loss of kinetic energy

Ans: (d)

4106. If the flow of air through the compressor is perpendicular to its axis, then it is a

- (a) Reciprocating compressor
- (b) Centrifugal compressor
- (c) Axial flow compressor
- (d) Turbo compressor

Ans: (b)

4107. A compressor mostly used for supercharging of I.C. engines is

- (a) Radial flow compressor
- (b) Axial flow compressor
- (c) Roots blower
- (d) Reciprocating compressor

Ans: (a)

4108. To avoid moisture troubles, the branch connections from compressed air lines should be taken from

- (a) Top side of main
- (b) Bottom side of main
- (c) Left side of main
- (d) Right side of main

Ans: (a)

4109. In an axial flow compressor, the ratio of pressure in the rotor blades to the pressure rise in the compressor in one stage is known as

- (a) Work factor
- (b) Slip factor
- (c) Degree of reaction
- (d) Pressure coefficient

Ans: (c)

4110. To avoid moisture troubles, the compressed air main line should

- (a) Rise gradually towards the point of use
- (b) Drop gradually towards the point of use
- (c) Be laid vertically
- (d) Be laid exactly horizontally

Ans: (b)

4111. The volumetric efficiency of a compressor

- (a) Increases with decrease in compression ratio
- (b) Decreases with decrease in compression ratio
- (c) Increases with increase in compression ratio
- (d) Decreases with increase in compression ratio

Ans: (d)

4112. The capacity of compressor will be highest when its intake temperature is

- (a) Lowest
- (b) Highest
- (c) Anything
- (d) Atmospheric

Ans: (d)

4113. The volume of air sucked by the compressor during its suction stroke is called

- (a) Free air delivery
- (b) Compressor capacity
- (c) Swept volume
- (d) None of these

Ans: (c)

4114. Which is false statement about multistage compression?

- (a) Power consumption per unit of air delivered is low
- (b) Volumetric efficiency is high
- (c) It is best suited for compression ratios around 7:1
- (d) The moisture in air is condensed in the intercooler

Ans: (b)

4115. Out of the following, from where you will prefer to take intake for air compressor

- (a) From an air conditioned room maintained at 20°C
- (b) From outside atmosphere at 1°C
- (c) From coal yard side
- (d) From a side where cooling tower is located nearby

Ans: (d)

4116. When air is to be compressed at a high pressure, then it is advantageous to use

- (a) Single stage compression
- (b) Multistage compression without intercooling
- (c) Multistage compression with intercooling
- (d) None of these

Ans: (c)

4117. In multistage compressor, the isothermal compression is achieved by

- (a) Employing intercooler
- (b) By constantly cooling the cylinder

- (c) By running compressor at very slow speed
- (d) By insulating the cylinder

Ans: (c)

4118. The compressor capacity is defined as the

- (a) Actual volume of the air delivered by the compressor when reduced to normal Temperature and pressure conditions
- (b) Volume of air delivered by the compressor
- (c) Volume of air sucked by the compressor during its suction stroke
- (d) None of the above

Ans: (b)

4119. The overall isothermal efficiency of the compressor is defined as the ratio of

- (a) Work required to compress the air isothermally to the actual work required to compress the air for the same pressure ratio
- (b) Isothermal power to the shaft power or B.P. of the motor or engine required to drive the compressor
- (c) Volume of free air delivery per stroke to the swept volume of the piston
- (d) Isentropic power to the power required to drive the compressor

Ans: (b)

4120. Reciprocating air compressor is best suited for

- (a) Large quantity of air at high pressure
- (b) Small quantity of air at high pressure
- (c) Small quantity of air at low pressure
- (d) Large quantity of air at low pressure

Ans: (a)

4121. In a double acting compressor, the air is compressed

- (a) In one cylinder
- (b) In two cylinders
- (c) In a single cylinder on both sides of the piston
- (d) In two cylinders on both sides of the piston

Ans: (c)

4122. After-cooler is used to

- (a) Cool the air
- (b) Decrease the delivery temperature for ease in handling
- (c) Cause moisture and oil vapour to drop out
- (d) Reduce volume

Ans: (c)

4123. Which of the following statement is correct?

- (a) The reciprocating compressors are best suited for high pressure and low volume capacity
- (b) The effect of clearance volume on power consumption is negligible for the

- same Volume of discharge
- (c) Both (A) and (B)
 - (d) None of these

Ans: (c)

4124. The reason for volumetric efficiency of reciprocating compressor being less than 100 percent is

- (a) Pressure drop across the valves
- (b) Superheating in compressor
- (c) Clearance volume and leakages
- (d) All of these

Ans: (d)

4125. Volumetric efficiency of a compressor without clearance volume

- (a) Increases with increase in compression ratio
- (b) Decreases with increase in compression ratio
- (c) Is not dependent upon compression ratio
- (d) May increase/decrease depending on compressor capacity

Ans: c

4126. The mean effective pressure of the compressor is the

- (a) Actual volume of the air delivered by the compressor when reduced to normal temperature and pressure conditions
- (b) Volume of air delivered by the compressor
- (c) Volume of air sucked by the compressor during its suction stroke
- (d) None of the above

Ans: (d)

4127. An ideal air compressor cycle without clearance on PV diagram can be represented by following processes

- (a) One adiabatic, two isobaric, and one constant volume
- (b) Two adiabatic and two isobaric
- (c) Two adiabatic, one isobaric and one constant volume
- (d) One adiabatic, one isobaric and two constant volumes

Ans: (a)

4128. Maximum work is done in compressing air when the compression is

- (a) Isothermal
- (b) Adiabatic
- (c) Polytropic
- (d) None of the above

Ans: (b)

4129. A rotary compressor is driven by an

- (a) Electric motor

- (b) Engine
- (c) Either (A) or (B)
- (d) None of these

Ans: (c)

4130. Isothermal compression though most efficient, but is not practicable because

- (a) It requires very big cylinder
- (b) It does not increase pressure much
- (c) It is impossible in practice
- (d) Compressor has to run at very slow speed to achieve it

Ans: (d)

4131. The ratio of work done per cycle to the swept volume in case of compressor is called

- (a) Compression index
- (b) Compression ratio
- (c) Compressor efficiency
- (d) Mean effective pressure

Ans: (d)

4132. Compression efficiency is compared against

- (a) Ideal compression
- (b) Adiabatic compression
- (c) Isentropic compression
- (d) Isothermal compression

Ans: (d)

4133. Ratio of indicated H.P. and brake H.P. is known as

- (a) Mechanical efficiency
- (b) Volumetric efficiency
- (c) Isothermal efficiency
- (d) Adiabatic efficiency

Ans: (a)

4134. The ratio of the volume of free air delivery per stroke to the swept volume of the piston, is known as

- (a) Compressor efficiency
- (b) Volumetric efficiency
- (c) Isothermal efficiency
- (d) Mechanical efficiency

Ans: (b)

4135. Clearance volume in actual reciprocating compressors is essential

- (a) To accommodate Valves in the cylinder head
- (b) To provide cushioning effect
- (c) To attain high volumetric efficiency

- (d) To provide cushioning effect and also to avoid mechanical bang of piston with cylinder head

Ans: (d)

4136. The overall efficiency of the compressed air system is the

- (a) Ratio of shaft output of the air motor to the shaft input to the compressor
- (b) Ratio of shaft input to the compressor to the shaft output of air motor
- (c) Product of shaft output of air motor and shaft input to the compressor
- (d) None of the above

Ans: (a)

4137. Adiabatic compression is one in which

- (a) Temperature during compression remains constant
- (b) No heat leaves or enters the compressor cylinder during compression
- (c) Temperature rise follows a linear relationship
- (d) Work done is maximum

Ans: (b)

4138. A machine used to raise the pressure of air is called

- (a) Gas turbine
- (b) I.C engine
- (c) Compressor
- (d) Air motor

Ans: (c)

4139. The overall isothermal efficiency of compressor is defined as the ratio of

- (a) Isothermal h.p. to the BHP of motor
- (b) Isothermal h.p. to adiabatic h.p.
- (c) Power to drive compressor to isothermal h.p.
- (d) Work to compress air isothermally to work for actual compression

Ans: (a)

4140. In a centrifugal compressor, the ratio of the _____ to the blade velocity is called slip factor.

- (a) Inlet whirl velocity
- (b) Outlet whirl velocity
- (c) Inlet velocity of flow
- (d) Outlet velocity of flow

Ans: (d)

4141. The most efficient method of compressing air is to compress it

- (a) Isothermally
- (b) Adiabatically
- (c) Isentropically
- (d) Isochorically

Ans: (a)

4142. The performance of air compressor at high altitudes will be ____ as compared to that at sea level.

- (a) Same
- (b) Lower
- (c) Higher
- (d) None of these

Ans: (b)

4143. The pressure and temperature conditions of air at the suction of compressor are

- (a) Atmospheric
- (b) Slightly more than atmospheric
- (c) Slightly less than atmospheric
- (d) Pressure slightly less than atmospheric and temperature slightly more than atmospheric

Ans: (d)

4144. Which of the following statement is correct as regard to centrifugal compressors?

- (a) The flow of air is parallel to the axis of the compressor
- (b) The static pressure of air in the impeller increases in order to provide centripetal Force on the air
- (c) The impeller rotates at high speeds
- (d) The maximum efficiency is higher than multistage axial flow compressors

Ans: (b)

4145. Isothermal compression efficiency can be attained by running the compressor

- (a) At very high speed
- (b) At very slow speed
- (c) At average speed
- (d) At zero speed

Ans: (b)

4146. The capacity of a compressor is expressed in

- (a) kg/m^2
- (b) kg/m^3
- (c) m^3/min
- (d) m^3/kg

Ans: (c)

4147. Cylinder clearance in a compressor should be

- (a) As large as possible
- (b) As small as possible
- (c) About 50% of swept volume
- (d) About 100% of swept volume

Ans: (b)

4148. The ratio of workdone per cycle to the stroke volume of the compressor is known as

- (a) Compressor capacity
- (b) Compression ratio
- (c) Compressor efficiency
- (d) Mean effective pressure

Ans: (d)

4149. The net work input required for compressor with increase in clearance volume

- (a) Increases
- (b) Decreases
- (c) Remains same
- (d) Increases/decreases depending on compressor capacity

Ans: (c)

4150. For minimum work required to compress and deliver a quantity of air by multistage compression

- (a) The compression ratio in each stage should be same
- (b) The intercooling should be perfect
- (c) The workdone in each stage should be same
- (d) All of the above

Ans: (d)

4151. Volumetric efficiency of a compressor with clearance volume

- (a) Increases with increase in compression ratio
- (b) Decreases with increase in compression ratio
- (c) Is not dependent upon compression ratio
- (d) May increase/decrease depending on compressor capacity

Ans: (b)

4152. Rotary compressor is best suited for

- (a) Large quantity of air at high pressure
- (b) Small quantity of air at high pressure
- (c) Small quantity of air at low pressure
- (d) Large quantity of air at low pressure

Ans: (b)

4153. The thrust on the rotor in a centrifugal compressor is produced by

- (a) Radial component
- (b) Axial component
- (c) Tangential component
- (d) None of the above

Ans: (b)

4154. A compressor at high altitude will draw
- (a) More power
 - (b) Less power
 - (c) Same power
 - (d) More/less power depending on other factors

Ans: (b)

4155. The temperature of air at the beginning of the compression stroke is ____ the atmospheric temperature.
- (a) Equal to
 - (b) Less than
 - (c) More than
 - (d) None of these

Ans: (c)

4156. Carbon arc lamps are commonly used in
- (a) photography
 - (b) cinema projectors
 - (c) domestic lighting
 - (d) street lighting

Ans: (b)

4157. The purpose of coating the fluorescent tube from inside with white powder is
- (a) to improve its life
 - (b) to improve the appearance
 - (c) to change the colour of light emitted to white
 - (d) to increase the light radiations due to secondary emissions

Ans: d

4158. Among the following ____ will need lowest level of illumination.
- (a) auditoriums
 - (b) railway platform
 - (c) displays
 - (d) fine engravings

Ans: (b)

4159. Which of the following instruments is used for the comparison of candle powers of different sources?
- (a) R radiometer
 - (b) Bunsen meter
 - (c) photometer
 - (d) candle meter

Ans: (c)

4160. In the fluorescent tube circuit the function of choke is primarily to

- a. reduce the flicker
 - b. minimise the starting surge
 - c. initiate the arc and stabilize it
 - d. reduce the starting current
- Ans: C

4161. The function of capacitor across the supply to the fluorescent tube is primarily to

- a. stabilize the arc
 - b. reduce the starting current
 - c. improve the supply power factor
 - d. reduce the noise
- Ans: C

4162. . Most affected parameter of a filament lamp due to voltage change is

- a. wattage
 - b. life
 - c. luminous efficiency
 - d. light output
- Ans: B

4163. In electric discharge lamps for stabilizing the arc

- a. a reactive choke is connected in series with the supply
 - b. a condenser is connected in series to the supply
 - c. a condenser is connected in parallel to the supply
 - d. a variable resistor is connected in the circuit
- Ans: A

e) Isolators, Circuit breakers and switch gears operation and maintenance

4164. **An isolator is designed to operate under:**

- A. Load conditions
 - B. No-load conditions
 - C. Fault conditions
 - D. High frequency
- Answer:** B. No-load conditions

4165. **Purpose of an isolator in a substation is to:**

- A. Break fault current
 - B. Interrupt load
 - C. Ensure safe disconnection for maintenance
 - D. Improve power factor
- Answer:** C. Ensure safe disconnection for maintenance

4166. **Which type of isolator is commonly used in substations?**

- A. Vertical break
- B. Horizontal break
- C. Pantograph
- D. All of the above

Answer: D. All of the above

4167. **Isolators must be interlocked with:**

- A. Earth switch
- B. Circuit breaker
- C. Voltage transformer
- D. CTs

Answer: B. Circuit breaker

4168. **Maintenance of isolators includes checking for:**

- A. Insulation resistance
- B. Mechanical alignment
- C. Contact condition
- D. All of the above

Answer: D. All of the above

4169. **A circuit breaker is used to:**

- A. Provide continuous power
- B. Break load and fault current
- C. Measure current
- D. Regulate voltage

Answer: B. Break load and fault current

4170. **Which of the following is a common type of circuit breaker?**

- A. Air blast
- B. SF₆ gas
- C. Vacuum
- D. All of the above

Answer: D. All of the above

4171. **Vacuum circuit breakers are preferred in:**

- A. EHV substations
- B. Low voltage circuits
- C. Medium voltage networks
- D. DC circuits

Answer: C. Medium voltage networks

4172. **Arc quenching in SF₆ circuit breakers is achieved by:**

- A. Cooling
- B. Ion recombination
- C. Oil blast

D. Compressed air

Answer: B. Ion recombination

4173. **Main contacts in a circuit breaker must withstand:**

- A. Light loads
- B. Arc current
- C. Insulation leakage
- D. Thermal overload only

Answer: B. Arc current

4174. **Which protection is provided by a circuit breaker?**

- A. Earth fault
- B. Overcurrent
- C. Short circuit
- D. All of the above

Answer: D. All of the above

4175. **Relay associated with circuit breakers detects:**

- A. Gas leakage
- B. Arc length
- C. Faults and initiates tripping
- D. Power factor

Answer: C. Faults and initiates tripping

4176. **Breaker failure protection ensures:**

- A. Primary tripping
- B. Secondary tripping if breaker fails
- C. Lockout of relay
- D. Alarm generation

Answer: B. Secondary tripping if breaker fails

4177. **Auto-reclosing is applicable to:**

- A. Isolators
- B. Load break switches
- C. Circuit breakers
- D. Fuses

Answer: C. Circuit breakers

4178. **Which auxiliary system is critical for circuit breaker operation?**

- A. Cooling fans
- B. DC trip supply
- C. Surge capacitors
- D. Lighting system

Answer: B. DC trip supply

4179. **Routine maintenance of circuit breakers includes:**

- A. Contact resistance measurement

- B. SF₆ gas pressure check
- C. Insulation resistance test
- D. All of the above

Answer: D. All of the above

4180. Timing test in circuit breaker maintenance is used to:

- A. Measure operating speed
 - B. Detect oil impurities
 - C. Check voltage drop
 - D. Balance current
- Answer:** A. Measure operating speed

4181. What is a typical trip time of a circuit breaker?

- A. 0.1 sec
 - B. 1–3 sec
 - C. 0.02–0.1 sec
 - D. 5 sec
- Answer:** C. 0.02–0.1 sec

4182. Contact resistance in a breaker should be:

- A. High
 - B. Zero
 - C. Within specified low range
 - D. Equal to insulation resistance
- Answer:** C. Within specified low range

4183. Which test is done for vacuum integrity in vacuum circuit breakers?

- A. DGA test
 - B. Vacuum bottle test
 - C. Contact resistance test
 - D. IR test
- Answer:** B. Vacuum bottle test

4184. Switchgear includes:

- A. Circuit breakers
 - B. Disconnectors
 - C. Protection relays
 - D. All of the above
- Answer:** D. All of the above

4185. Metal-clad switchgear means:

- A. Metal enclosure
 - B. Separate compartments for each function
 - C. Fixed insulation
 - D. Air insulation
- Answer:** B. Separate compartments for each function

4186. Indoor switchgear is generally:

- A. Oil type
- B. Air insulated
- C. SF₆ gas insulated
- D. Both B and C

Answer: D. Both B and C

4187. Gas-insulated switchgear (GIS) is preferred for:

- A. Compact substations
- B. Outdoor only
- C. Large rural substations
- D. Low voltage

Answer: A. Compact substations

4188. Load break switches are designed to:

- A. Break fault current
- B. Operate under no load
- C. Interrupt normal load current safely
- D. Detect harmonics

Answer: C. Interrupt normal load current safely

4189. Arc interruption medium in air circuit breaker is:

- A. SF₆
- B. Oil
- C. Air
- D. Vacuum

Answer: C. Air

4190. Oil circuit breakers use oil for:

- A. Cooling
- B. Arc quenching and insulation
- C. Current conduction
- D. Alarm indication

Answer: B. Arc quenching and insulation

4191. Major disadvantage of oil circuit breakers:

- A. High cost
- B. Risk of fire and maintenance need
- C. Low breaking capacity
- D. Poor insulation

Answer: B. Risk of fire and maintenance need

4192. Main feature of vacuum circuit breakers:

- A. Arc travels in vacuum
- B. Low maintenance

- C. Compact
 - D. All of the above
- Answer:** D. All of the above

4193. **Which circuit breaker is best suited for urban indoor substations?**

- A. Air blast
- B. Vacuum
- C. Oil
- D. Air insulated

Answer: B. Vacuum

4194. **Primary injection test checks:**

- A. Relay wiring
- B. Overall trip functionality
- C. Oil level
- D. SF₆ pressure

Answer: B. Overall trip functionality

4195. **IR (Insulation Resistance) test is done using:**

- A. Ammeter
- B. Megger
- C. Multimeter
- D. LCR meter

Answer: B. Megger

4196. **Breaker contact wear is typically indicated by:**

- A. Excessive noise
- B. Carbon deposits
- C. Increased contact resistance
- D. All of the above

Answer: D. All of the above

4197. **SF₆ gas leakage test is done using:**

- A. Multimeter
- B. Leak detector sensor
- C. IR thermometer
- D. Water bath

Answer: B. Leak detector sensor

4198. **Trip coil testing ensures:**

- A. Relay pickup
- B. Breaker response to trip command
- C. Load flow control
- D. Fuse status

Answer: B. Breaker response to trip command

4199. **Before maintenance, the circuit breaker must be:**

- A. Grounded and isolated
- B. Heated
- C. Shorted
- D. Operated once

Answer: A. Grounded and isolated

4200. **High arc temperature during interruption can reach:**

- A. 200°C
- B. 1,500°C
- C. 6,000–10,000°C
- D. 500°C

Answer: C. 6,000–10,000°C

4201. **IEC standard for high-voltage breakers:**

- A. IEC 61850
- B. IEC 60298
- C. IEC 62271
- D. IEC 60947

Answer: C. IEC 62271

4202. **OSHA safety lockout for switchgear means:**

- A. Isolating main cable
- B. Physically locking circuit breaker in OFF position
- C. Grounding transformer
- D. Discharging capacitor

Answer: B. Physically locking circuit breaker in OFF position

4203. **A breaker should not be closed if:**

- A. Trip coil is healthy
- B. Gas pressure is low
- C. Remote signal is active
- D. Relay is bypassed

Answer: B. Gas pressure is low

4204. **Digital switchgear integrates:**

- A. IEDs (Intelligent Electronic Devices)
- B. Manual operation only
- C. Only CTs
- D. Only SF₆ insulation

Answer: A. IEDs (Intelligent Electronic Devices)

4205. **Intelligent switchgear allows:**

- A. Predictive maintenance
- B. Manual tripping
- C. No control

D. Power factor measurement

Answer: A. Predictive maintenance

4206. **Breaker tripping can be caused by:**

A. Overload

B. Earth fault

C. Differential protection

D. All of the above

Answer: D. All of the above

4207. **Capacitive voltage divider in switchgear is used for:**

A. Current sensing

B. Voltage measurement

C. Temperature sensing

D. Load control

Answer: B. Voltage measurement

4208. **Synchro-check relay prevents:**

A. Breaker closing under out-of-sync conditions

B. Arc faults

C. Short circuit

D. Overvoltage

Answer: A. Breaker closing under out-of-sync conditions

4209. **Minimum oil CBs use:**

A. Entire tank full of oil

B. Oil around arc only

C. No oil

D. Oil under pressure

Answer: B. Oil around arc only

4210. **Auto-reclosing is common in:**

A. Transmission line breakers

B. Distribution fuse cut-outs

C. Transformers

D. Switchboards

Answer: A. Transmission line breakers

4211. **Busbar protection is typically of type:**

A. Overcurrent

B. Distance

C. Differential

D. Impedance

Answer: C. Differential

4212. **Operating mechanism of circuit breaker includes:**

- A. Spring
- B. Hydraulic
- C. Pneumatic
- D. All of the above

Answer: D. All of the above

4213. **Main criteria for breaker selection include:**

- A. Voltage and current rating
- B. Fault level
- C. Duty cycle
- D. All of the above

Answer: D. All of the above

f) Electricity Tariffs

4214. Which regulatory body in India is responsible for determining tariffs for inter-state electricity generation and transmission?

- (a) State Electricity Regulatory Commissions (SERCs)
- (b) Central Electricity Regulatory Commission (CERC)
- (c) Tariff Advisory Committee
- (d) Central Electricity Authority (CEA)

Ans: (b)

4215. What is the primary purpose of the Central Electricity Regulatory Commission (CERC)?

- (a) To regulate the production and distribution of electricity within states.
- (b) To regulate the tariff and conditions of supply of electricity between states.
- (c) To oversee the construction of power plants.
- (d) To regulate the consumption of electricity by industries.

Ans: (b)

4216. Which of the following is not a factor considered by CERC when determining electricity tariffs?

- (a) Generation costs
- (b) Transmission costs
- (c) Distribution costs
- (d) Consumer preferences for electricity sources

Ans: (d)

4217. What is a two-part tariff?

- (a) A tariff that charges a fixed rate per unit of electricity consumed, regardless of usage.
- (b) A tariff that includes a fixed charge for infrastructure and a variable charge based on actual energy usage.
- (c) A tariff that charges based on peak demand and total energy consumed.

(d) A tariff that penalizes consumers for having a low power factor.

Ans: (b)

4218. Which of the following is not a component of Indian electricity tariffs?

- (a) Fixed Charges
- (b) Variable Charges
- (c) Energy Tax
- (d) Peak Demand Charges

Ans: (c)

4219. What is a two-part tariff?

- (a) A tariff that includes fixed and variable charges
- (b) A tariff that charges based on time of day
- (c) A tariff that charges based on power factor
- (d) A tariff that charges based on energy efficiency

Ans: (a)

4220. Who is responsible for setting electricity tariffs in a state?

- (a) The Central Electricity Regulatory Commission
- (b) The Ministry of Power
- (c) The State Electricity Regulatory Commission
- (d) The DISCOM

Ans: (c)

4221. Which tariff structure incentivizes consumers to use electricity during off-peak hours by offering lower rates during those periods?

- (a) Simple tariff
- (b) Two-part tariff
- (c) Demand-based tariff
- (d) Time-of-use tariff

Ans: (d)

4222. Which tariff encourages consumers to manage their energy consumption during peak hours by charging for both the maximum demand and energy usage?

- (a) Simple tariff
- (b) Two-part tariff
- (c) Demand-based tariff
- (d) Time-of-use tariff

Ans: (c)

4223. Which tariff structure includes a fixed cost component, representing infrastructure, and a variable cost component, representing actual energy consumption?

- (a) Simple tariff
- (b) Two-part tariff
- (c) Demand-based tariff

(d) Time-of-use tariff

Ans: (b)

4224. Which of the following tariffs charges the same rate per kWh, regardless of the amount of electricity used?

- (a) Simple tariff
- (b) Two-part tariff
- (c) Demand-based tariff
- (d) Time-of-use tariff

Ans: (a)

4225. ToD related to energy recording meter means

- (a) Time of Day
- (b) Tariff on Demand
- (c) Time of Demand
- (d) Tariff of Day

Ans: (a)

4226. The unit cost of solar energy procured from solar power developer at RWF is.....

- (a) Rs. 5.5
- (b) Rs. 4.95
- (c) Rs. 6.0
- (d) Rs. 6.50

Ans: (a)

4227. Penalty for low power factor is imposed on

- (a) Residential and commercial consumers
- (b) Industrial consumers
- (c) Agricultural consumers
- (d) All of above

Ans: (b)

4228. Monthly consumption of a consumer is 500KWh. What will be the monthly bill at the following rate?

First 100 unit Rs 0.6/KWh

Next 100 units Rs 0.5/KWh

Remaining units Rs 0.4/KWh

- (a) Rs 250
- (b) Rs 25
- (c) Rs 230
- (d) Rs 23

Ans: (c)

4229. The KWh energy supplied in a period divided by time period is known as _____?

- (a) Connected load
- (b) Maximum load

- (c) Average load
- (d) None of the above

Ans: (c)

4230. Tariff defines the rate at which ----- is supplied to consumer.

- (a) Power
- (b) Energy
- (c) Current
- (d) Voltage

Ans: (b)

4231. Variation between actual energy consumption and scheduled energy are accounted through which charges as per CERC regulations?

- (a) Unscheduled Interchange (UI) charges
- (b) Energy charges
- (c) Capacity charges
- (d) None of the above

Ans: (a)

4232. Under which IE rule all electric supply lines and apparatus must have sufficient rating for power, insulation, and mechanical strength?

- (a) Rule 29
- (b) Rule 31
- (c) Rule 35
- (d) Rule 45

Ans: (a)

4233. Which IE rule specifies that an independent cut-out must be provided for each consumer if multiple consumers are supplied through a common service line?

- (a) Rule 30
- (b) Rule 31
- (c) Rule 32
- (d) Rule 35

Ans: (b)

4234. According to IE Rule 33, where should the supplier provide an earthed terminal on a consumer's premises?

- (a) Near the electricity meter
- (b) Near the main circuit breaker
- (c) Near the point of commencement of supply
- (d) At the transformer

Ans: (c)

4235. What does IE Rule 35 of the Indian Electricity Rules, 1956, mandate for medium, high, and extra-high voltage installations?

- (a) Use of insulated wiring
- (b) Installation of transformers
- (c) Display of danger notice
- (d) Provision of emergency power backup

Ans: (c)

4236. IE Rule 44 mandates that instructions for treating electrical shock victims should be affixed in which languages?

- (a) English and Hindi only
- (b) Local language only
- (c) English, Hindi, and local language
- (d) Hindi and regional language

Ans: (c)

4237. Under IE Rule 45, who must follow electrical safety precautions?

- (a) Consumers
- (b) Electrical contractors
- (c) Workmen and suppliers
- (d) All of the above

Ans: (d)

4238. As per IE Rule 54, wWhat is the maximum allowable variation in declared voltage for high voltage supply under Rule 54?

- (a) $\pm 5\%$
- (b) $+6\%$ to -9%
- (c) $\pm 10\%$
- (d) $+9\%$ to -6%

Ans: (b)

4239. According to IE Rule 56, who is allowed to break the seal of an electrical meter?

- (a) The consumer
- (b) The electrical contractor
- (c) Only the supplier
- (d) The wireman

Ans: (c)

4240. As per IE Rule, What is the minimum vertical clearance required for high voltage lines above 11,000V passing above a building?

- (a) 2.5 meters
- (b) 3.7 meters
- (c) 4.6 meters
- (d) 5.2 meters

Ans: (b)

4241. What is the minimum horizontal clearance required for extra-high voltage (EHV) lines above 33,000V passing near a building?

- (a) 1.2 meters
- (b) 2.0 meters
- (c) 2.3 meters
- (d) 2.0 meters plus 0.3 meters for every additional 33,000Volts or part thereof.

Ans: (d)

4242. As per IE Rule, the person breaking the seal shall be punishable with fine which may extend to

- (a) Rs. 50
- (b) Rs. 100
- (c) Rs. 200
- (d) Rs. 500

Ans: (c)

4243. Which IE rule states that electrical accidents must be reported within 24 hours to the Inspector?

- (a) Rule 33
- (b) Rule 44A
- (c) Rule 55
- (d) Rule 77

Ans: (b)

4244. What is the minimum clearance for low voltage overhead lines erected across a street?

- (a) 3.5 meters
- (b) 4.6 meters
- (c) 5.8 meters
- (d) 6.1 meters

Ans: (c)

4245. According to Rule 76, what is the minimum factor of safety for hand-molded concrete supports?

- (a) 1.5
- (b) 2.0
- (c) 2.5
- (d) 3.0

Ans: (c)

4246. How many earth connections are required for the motor frame as per the IE rule 61?

- (a) One
- (b) Two separate and distinct
- (c) Three separate and distinct
- (d) All of these

Ans: (b)

4247. What is medium voltage, according to IE Rule 28?

- (a) Voltage that does not exceed 11000V under normal conditions
- (b) Voltage that does not exceed 440V under normal conditions
- (c) Voltage that does not exceed 650V under normal conditions
- (d) Voltage that does not exceed 22000V under normal conditions

Ans: (c)

4248. Which of the following Indian Electrical Rules describes about the periodical testing of consumer's installation?

- (a) Rule 56
- (b) Rule 46
- (c) Rule 54
- (d) Rule 31

Ans: (b)

4249. As per Indian electricity rule, gas pressure type protection to give alarm and tripping shall be provided on all high and extra-high voltage transformers of ratings and above.

- (a) 2 MVA
- (b) 500kVA
- (c) 10MVA
- (d) 1000kVA

Ans: (d)

4250. When did The Electricity Act, 2003 come into force?

- (a) 01 April 2004
- (b) 01 March 2003
- (c) 10 June 2003
- (d) 23 April 2004

Ans: (c)

4251. Which section of The Electricity Act, 2003 deals with the Captive generation?

- (a) Section 12
- (b) Section 9
- (c) Section 14
- (d) Section 20

Ans: (b)

4252. Which section of The Electricity Act, 2003 deals with Conditions of licence?

- (a) Section 16
- (b) Section 14
- (c) Section 13
- (d) Section 18

Ans: (a)

4253. Section 25 of The Electricity Act, 2003 deals with -----?

- (a) National Load Despatch Centre
- (b) Inter-State, regional and inter-regional transmission
- (c) State Transmission Utility and functions.
- (d) Power to recover charges

Ans: (b)

4254. Vesting of utility in purchaser is provided in section ----- of The Electricity Act 2003.

- (a) Section 24
- (b) Section 22
- (c) Section 21
- (d) Section 23

Ans: (c)

4255. Section 42 of The Electricity Act, 2003 provides -----?

- (a) Duties of distribution licensee and open access
- (b) Charges for intervening transmission facilities
- (c) Power to recover charges
- (d) Power to require security

Ans: (a)

4256. Which section of The Electricity Act, 2003 deals with National policy on electrification and local distribution in rural areas?

- (a) Section 7
- (b) Section 4
- (c) Section 5
- (d) Section 9

Ans: (c)

4257. Section 12 of The Electricity Act, 2003 deals with -----?

- (a) Authorised persons to transmit, supply, etc., electricity
- (b) Procedure for grant of licence
- (c) Revocation of licence
- (d) Other business of transmission licensee

Ans: (a)

4258. Which section of The Electricity Act, 2003 deals with the Agreements with respect to supply or purchase of electricity?

- (a) Section 47
- (b) Section 49
- (c) Section 44
- (d) Section 45

Ans: (b)

4259. Section 10 of The Electricity Act, 2003 deals with -----?
- (a) Conditions of licence
 - (b) Generating company and requirement for setting up of generating station
 - (c) Duties of generating companies
 - (d) Control of transmission and use of electricity
- Ans: (c)**
4260. Which act is used to regulate the Indian power sector today?
- (a) Indian Electricity Act 1910
 - (b) Indian Electricity Act 1948
 - (c) Indian Electricity Act 2000
 - (d) Indian Electricity Act 2003
- Ans: (d)**
4261. The Non-discriminatory provision for the use of transmission lines or distribution system by any licensee or consumer or a person engaged in generation in accordance with the regulations specified by the Appropriate Commission is called
- (a) Scheduling
 - (b) Trading
 - (c) Open Access
 - (d) Distribution
- Ans: (c)**
4262. Energy sources which are inexhaustible are known as
- (a) Commercial energy
 - (b) Primary energy
 - (c) Renewable energy
 - (d) Secondary energy
- Ans: (c)**
4263. Which sections of the Electricity Act, 2003 deal with tariff?
- (a) Section 51 to 56
 - (b) Section 61 to 66
 - (c) Section 71 to 76
 - (d) Section 81 to 86
- Ans: (b)**

g) Substations at RWF

4264. **What is the primary function of a substation at the Rail Wheel Factory?**
- A) To manufacture rail wheels
 - B) To convert and distribute electrical power
 - C) To store raw materials
 - D) To assemble train components
- Answer: B) To convert and distribute electrical power**

4265. Which voltage is typically supplied to the Rail Wheel Factory's MRS substation?

- A) 11 kV
- B) 66 kV
- C) 110 kV
- D) 220 kV

Answer: B) 66 kV

4266. What type of power is primarily used in the Rail Wheel Factory's substation?

- A) Direct Current (DC)
- B) Alternating Current (AC)
- C) Both AC and DC
- D) None

Answer: B) Alternating Current (AC)

4267. Which transformer configuration is commonly used in the Rail Wheel Factory's substation?

- A) Delta-Delta
- B) Star-Delta
- C) Delta-Star
- D) Star-Star

Answer: C) Delta-Star

4268. What is the purpose of a circuit breaker in the substation?

- A) To measure voltage
- B) To interrupt fault currents
- C) To regulate power flow
- D) To convert AC to DC

Answer: B) To interrupt fault currents

4269. Which device is used to isolate sections of the circuit for maintenance?

- A) Circuit Breaker
- B) Isolator
- C) Transformer
- D) Busbar

Answer: B) Isolator

4270. What type of busbar arrangement is typically employed in the Rail Wheel Factory's substation?

- A) Single Busbar
- B) Double Busbar
- C) Main and Transfer Busbar
- D) Ring Busbar

Answer: C) Main and Transfer Busbar

4271. Which protection device is used to detect and isolate faults in the system?

- A) Fuse
- B) Relay
- C) Circuit Breaker
- D) Isolator

Answer: B) Relay

4272. What is the function of a lightning arrester in the substation?

- A) To measure current
- B) To protect equipment from lightning strikes
- C) To regulate voltage
- D) To convert AC to DC

Answer: B) To protect equipment from lightning strikes

4273. Which type of transformer is used to step down the voltage in the substation?

- A) Step-up Transformer
- B) Step-down Transformer
- C) Isolation Transformer
- D) Auto Transformer

Answer: B) Step-down Transformer

4274. What is the recommended maintenance frequency for transformers in the substation?

- A) Annually
- B) Bi-annually
- C) Every 5 years
- D) As per manufacturer's guidelines

Answer: D) As per manufacturer's guidelines

4275. Which test is performed to check the insulation resistance of transformers?

- A) Oil Testing
- B) Megger Test
- C) Load Test
- D) Dielectric Test

Answer: B) Megger Test

4276. What is the purpose of earthing in the substation?

- A) To prevent overloading
- B) To ensure safety by providing a path for fault currents
- C) To regulate voltage
- D) To measure current

Answer: B) To ensure safety by providing a path for fault currents

4277. Which document provides detailed instructions for the operation and maintenance of substations?

- A) Standard Operating Procedures (SOP)

- B) Maintenance Manual
 - C) Electrical Safety Rules
 - D) All of the above
- Answer:** D) All of the above

4278. What is the purpose of a battery charger in the substation?

- A) To store electrical energy
 - B) To provide backup power for control circuits
 - C) To regulate voltage
 - D) To convert AC to DC
- Answer:** B) To provide backup power for control circuits

4279. Which safety device is used to protect personnel from electrical shock?

- A) Fuse
 - B) Circuit Breaker
 - C) Residual Current Device (RCD)
 - D) Lightning Arrester
- Answer:** C) Residual Current Device (RCD)

4280. What is the function of a busbar in the substation?

- A) To step up voltage
 - B) To distribute electrical power to various circuits
 - C) To convert AC to DC
 - D) To measure current
- Answer:** B) To distribute electrical power to various circuits

4281. Which equipment is used to measure the current in the substation?

- A) Voltmeter
 - B) Ammeter
 - C) Wattmeter
 - D) Frequency Meter
- Answer:** B) Ammeter

4282. What is the purpose of a control panel in the substation?

- A) To monitor and control electrical parameters
 - B) To store electrical energy
 - C) To convert AC to DC
 - D) To regulate voltage
- Answer:** A) To monitor and control electrical parameters

4283. Which device is used to protect the transformer from overcurrent?

- A) Fuse
 - B) Circuit Breaker
 - C) Relay
 - D) All of the above
- Answer:** D) All of the above

