

1.DC GENERATORS

1. Laminations of core are generally made of

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

Ans: c

2. Which of the following could be lamina-approximately the thickness of laminations of a D.C machine ?

- (a) 0.005 mm
- (b) 0.05 mm
- (c) 0.5 mm
- (d) 5 mm

Ans: c

3. The armature of D.C. generator is laminated to

- (a) reduce the bulk
- (b) provide the bulk
- (c) insulate the core
- (d) reduce eddy current loss

Ans: d

4. The resistance of armature winding depends on

- (a) length of conductor
- (b) cross-sectional area of the conductor
- (c) number of conductors
- (d) all of the above

Ans: d

5. The field coils of D.C. generator are usually made of

- (a) mica

- (b) copper
- (c) cast iron
- (d) carbon

Ans: b

6. The commutator segments are connected to the armature conductors by means of

- (a) copper lugs
- (b) resistance wires
- (c) insulation pads
- (d) brazing

Ans: a

7. In a commutator

- (a) copper is harder than mica
- (b) mica and copper are equally hard
- (c) mica is harder than copper
- (d) none of the above

Ans: c

8. In D.C. generators the pole shoes are fastened to the pole core by

- (a) rivets
- (b) counter sunk screws
- (c) brazing
- (d) welding

Ans: b

9. According to Fleming's right-hand rule for finding the direction of induced e.m.f., when middle finger points in the direction of induced e.m.f., forefinger will point in the direction of

- (a) motion of conductor
- (b) lines of force
- (c) either of the above
- (d) none of the above

Ans: b

10. Fleming's right-hand rule regarding direction of induced e.m.f., correlates

- (a) magnetic flux, direction of current flow and resultant force
- (b) magnetic flux, direction of motion and the direction of e.m.f. induced
- (c) magnetic field strength, induced voltage and current
- (d) magnetic flux, direction of force and direction of motion of conductor

Ans: b

11. While applying Fleming's right-hand rule to find the direction of induced e.m.f., the thumb points towards

- (a) direction of induced e.m.f.
- (b) direction of flux
- (c) direction of motion of the conductor if forefinger points in the direction of generated e.m.f.
- (d) direction of motion of conductor, if forefinger points along the lines of flux

Ans: d

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

- (a) ball bearings
- (b) bush bearings
- (c) magnetic bearings
- (d) needle bearings

Ans: a

13. 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

14. In lap winding, the number of brushes is always

- (a) double the number of poles
- (b) same as the number of poles
- (c) half the number of poles
- (d) two

Ans: b

15. For a D.C. generator when the number of poles and the number of armature conductors is fixed, then which winding will give the higher e.m.f. ?

- (a) Lap winding
- (b) Wave winding
- (c) Either of (a) and (b) above
- (d) Depends on other features of design

Ans: b

16. In a four-pole D.C. machine

- (a) all the four poles are north poles
- (b) alternate poles are north and south
- (c) all the four poles are south poles
- (d) two north poles follow two south poles

Ans: b

17. Copper brushes in D.C. machine are used

- (a) where low voltage and high currents are involved
- (b) where high voltage and small currents are involved
- (c) in both of the above cases
- (d) in none of the above cases

Ans: a

18. A separately excited generator as compared to a self-excited generator

- (a) is amenable to better voltage control
- (b) is more stable
- (c) has exciting current independent of load current

(d) has all above features

Ans: d

19. In case of D.C. machines, mechanical losses are primary function of

(a) current

(b) voltage

(c) speed

(d) none of above

Ans: c

20. Iron losses in a D.C. machine are independent of variations in

(a) speed

(b) load

(c) voltage

(d) speed and voltage

Ans: b

21. In D.C. generators, current to the external circuit from armature is given through

(a) commutator

(b) solid connection

(c) slip rings

(d) none of above

Ans: a

23. Brushes of D.C. machines are made of

(a) carbon

(b) soft copper

(c) hard copper

(d) all of above

Ans: a

24. If B is the flux density, l the length of conductor and v the velocity of conductor, then induced e.m.f. is given by

- (a) Blv
- (b) Blv^2
- (c) Bl^2v
- (d) Bl^2v^2

Ans: a

25. In case of a 4-pole D.C. generator provided with a two layer lap winding with sixteen coils, the pole pitch will be

- (a) 4
- (b) 8
- (c) 16
- (d) 32

Ans: b

26. The material for commutator brushes is generally

- (a) mica
- (b) copper
- (c) cast iron
- (d) carbon

Ans: d

27. The insulating material used between the commutator segments is normally

- (a) graphite
- (b) paper
- (c) mica
- (d) insulating varnish

Ans: c

28. In D.C. generators, the brushes on commutator remain in contact with conductors which

- (a) lie under south pole
- (b) lie under north pole
- (c) lie under interpolar region
- (d) are farthest from the poles

Ans: c

29. If brushes of a D.C. generator are moved in order to bring these brushes in magnetic

neutral axis, there will be

- (a) demagnetisation only
- (b) cross magnetisation as well as magnetisation
- (c) crossmagnetisation as well as demagnetising
- (d) cross magnetisation only

Ans: c

30. Armature reaction of an unsaturated D.C. machine is

- (a) crossmagnetising
- (b) demagnetising
- (c) magnetising
- (d) none of above

Ans: a

31. D.C. generators are connected to the busbars or disconnected from them only under the floating condition

- (a) to avoid sudden loading of the primemover
- (b) to avoid mechanical jerk to the shaft
- (c) to avoid burning of switch contacts

(d) all above

Ans: d

32. Eddy currents are induced in the pole shoes of a D.C. machine due to

- (a) oscillating magnetic field
- (b) pulsating magnetic flux
- (c) relative rotation between field and armature
- (d) all above

Ans: c

33. In a D.C. machine, short-circuited field coil will result in

- (a) odour of burning insulation
- (b) unbalanced magnetic pull producing vibrations
- (c) reduction of generated voltage for which excitation has to be increased to maintain the voltage
- (d) all above

Ans:

34. Equilizer rings are required in case armature is

- (a) wave wound
- (b) lap wound
- (c) delta wound
- (d) duplex wound

Ans: b

35. Welding generator will have

- (a) lap winding
- (b) wave winding
- (c) delta winding
- (d) duplex wave winding

Ans: a

36. In case of D.C. machine winding, number of commutator segments is equal to

- (a) number of armature coils
- (b) number of armature coil sides
- (c) number of armature conductors
- (d) number of armature turns

Ans: a

37. For a D.C. machines laboratory following type of D.C. supply will be suitable

- (a) rotary converter
- (b) mercury arc rectifier
- (c) induction motor D.C. generator set

(d) synchronous motor D.C. generator set

Ans: c

38. 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) to discharge all the above functions

Ans: d

39. In the case of lap winding resultant pitch is

- (a) multiplication of front and back pitches
- (b) division of front pitch by back pitch
- (c) sum of front and back pitches
- (d) difference of front and back pitches

Ans: d

40. A D.C. welding generator has

- (a) lap winding
- (b) wave moving
- (c) duplex winding
- (d) any of the above

Ans: a

41. Which of the following statement about D.C. generators is false ?

- (a) Compensating winding in a D.C. machine helps in commutation
- (b) In a D. C. generator interpoles winding is connected in series with the armature winding
- (c) Back pitch and front pitch are both odd and approximately equal to the pole pitch
- (d) Equilizing bus bars are used with parallel running of D.C. shunt generators

Ans: d

42. The demagnetising component of armature reaction in a D.C. generator

- (a) reduces generator e.m.f.
- (b) increases armature speed
- (c) reduces interpoles flux density
- (d) results in sparking trouble

Ans: a

43. Magnetic field in a D.C. generator is produced by

- (a) electromagnets
- (b) permanent magnets
- (c) both (a) and (b)
- (d) none of the above

Ans: a

44. The number of brushes in a commutator depends on

- (a) speed of armature
- (b) type of winding
- (c) voltage
- (d) amount of current to be collected

Ans: d

45. Compensating windings are used in D.C. generators

- (a) mainly to reduce the eddy currents by providing local short-circuits
- (b) to provide path for the circulation of cooling air
- (c) to neutralise the cross-magnetising effect of the armature reaction
- (d) none of the above

Ans: c

46. Which of the following components of a D.C. generator plays vital role for providing direct current of a D.C. generator ?

- (a) Dummy coils
- (b) Commutator
- (c) Eye bolt
- (d) Equilizer rings

Ans: b

47. In a D.C. generator the ripples in the direct e.m.f. generated are reduced by

- (a) using conductor of annealed copper
- (b) using commutator with large number of segments
- (c) using carbon brushes of superior quality
- (d) using equiliser rings

Ans: c

48. In D.C. generators, lap winding is used for

- (a) high voltage, high current
- (b) low voltage, high current
- (c) high voltage, low current
- (d) low voltage, low current

Ans: b

49. Two generators A and B have 6-poles each. Generator A has wave wound armature

while generator B has lap wound armature. The ratio of the induced e.m.f. of generator A and B will be

(a) 2 : 3

(b) 3 : 1

(c) 3 : 2

(d) 1 : 3

Ans: b

50. The voltage drop for which of the following types of brush can be expected to be least

(a) Graphite brushes

(b) Carbon brushes

(c) Metal graphite brushes

(d) None of the above

Ans: c

51. The e.m.f. generated by a shunt wound D.C. generator is E . Now while pole flux remains constant, if the speed of the generator is doubled, the e.m.f. generated will be

(a) $E/2$

(b) $2E$

(c) slightly less than E

(d) E

Ans: b

52. In a D.C. generator the actual flux distribution depends upon

(a) size of air gap

(b) shape of the pole shoe

(c) clearance between tips of the adjacent pole shoes

(d) all of the above

Ans:

53. The armature core of a D.C. generator is usually made of

(a) silicon steel

(b) copper

(c) non-ferrous material

(d) cast-iron

Ans: a

9.63. Satisfactory commutation of D.C. machines requires

- (a) brushes should be of proper grade and size
- (b) brushes should smoothly run in the holders
- (c) smooth, concentric commutator properly undercut
- (d) all of the above

Ans: d

54. Open circuited armature coil of a D.C. machine is

- (a) identified by the scarring of the commutator segment to which open circuited coil is connected

- (b) indicated by a spark completely around the commutator
- (c) both (a) and (b)
- (d) none of the above

Ans: c

55. In a D.C. machine, fractional pitch winding is used

- (a) to increase the generated voltage
- (b) to reduce sparking
- (c) to save the copper because of shorter end connections
- (d) due to (b) and (c) above

Ans:

56. For the parallel operation of two or more D.C. compound generators, we should ensure that

- (a) voltage of the incoming generator should be same as that of bus bar
- (b) polarity of incoming generator should be same as that of bus bar
- (c) all the series fields should be run in parallel by means of equalizer connection
- (d) series fields of all generators should be either on positive side or negative side of the armature
- (e) all conditions mentioned above should be satisfied

Ans: d

57. D.C. series generator is used

- (a) to supply traction load
- (b) to supply industrial load at constant voltage

- (c) voltage at the toad end of the feeder
- (d) for none of the above purpose

Ans: c

58. Following D.C. generator will be in a position to build up without any residual magnetism in the poles

- (a) series generator
- (b) shunt generator
- (c) compound generator
- (d) self-excited generator

Ans: d

59. Interpole flux should be sufficient to

- (a) neutralise the commutating self induced e.m.f.
- (b) neutralise the armature reaction flux
- (c) neutralise both the armature reaction flux as well as commutating e.m.f. induced in the coil

- (d) perform none of the above functions

Ans: c

60. D.C. generator generally preferred for charging automobile batteries is

- (a) series generator
- (b) shunt generator
- (c) long shunt compound generator
- (d) any of the above

Ans: c

61. In a D.C. generator the number of mechanical degrees and electrical degrees will be the same when

- (a) r.p.m. is more than 300
- (b) r.p.m. is less than 300
- (c) number of poles is 4
- (d) number of poles is 2

Ans: d

62. Permeance is the reciprocal of

- (a) flux density
- (b) reluctance
- (c) ampere-turns
- (d) resistance

Ans: b

63. In D.C. generators the polarity of the interpoles

- (a) is the same as that of the main pole ahead
- (b) is the same as that of the immediately preceding pole
- (c) is opposite to that of the main pole ahead
- (d) is neutral as these poles do not play part in generating e.m.f.

Ans: a

64. The e.m.f. generated in a D.C. generator is directly proportional to

- (a) flux/pole
- (b) speed of armature
- (c) number of poles
- (d) all of the above

Ans: b

65. In a D.C. generator the magnetic neutral axis coincides with the geometrical neutral axis, when

- (a) there is no load on the generator
- (b) the generator runs on full load
- (c) the generator runs on overload
- (d) the generator runs on designed speed

Ans: a

66. In a D.C. generator in order to reduce sparking at brushes, the self-induced e.m.f. in the coil is neutralised by all of the following except

- (a) interpoles
- (b) dummy coils
- (c) compensating winding
- (d) shifting of axis of brushes

Ans: b

67. In D.C. generators on no-load, the air gap flux distribution in space is

- (a) sinusoidal
- (b) triangular
- (c) pulsating
- (d) flat topped

Ans: d

68. A shunt generator running at 1000 r.p.m. has generated e.m.f. as 200 V. If the speed increases to 1200 r.p.m., the generated e.m.f. will be nearly

- (a) 150 V
- (b) 175 V
- (c) 240 V
- (d) 290 V

Ans: c

69. The purpose of providing dummy coils in a generator is

- (a) to reduce eddy current losses
- (b) to enhance flux density
- (c) to amplify voltage
- (d) to provide mechanical balance for the rotor

Ans: d

70. In a shunt generator the voltage build up is generally restricted by

- (a) speed limitation
- (b) armature heating
- (c) insulation restrictions
- (d) saturation of iron

Ans:

71. If a D.C. generator fails to build up the probable cause could not be

- (a) imperfect brush contact
- (b) field resistance less than the critical resistance
- (c) no residual magnetism in the generator
- (d) faulty shunt connections tending to reduce the residual magnetism

Ans: b

72. Flashing the field of D.C. generator means

- (a) neutralising residual magnetism
- (b) creating residual magnetism by a D.C. source
- (c) making the magnetic losses of forces parallel
- (d) increasing flux density by adding extra turns of windings on poles

Ans: b

73. The e.m.f. induced in the armature of a shunt generator is 600 V. The armature resistance is 0.1 ohm. If the armature current is 200 A, the terminal voltage will be

- (a) 640 V
- (b) 620 V
- (c) 600 V
- (d) 580 V

Ans: d

74. In a D.C. generator the critical resistance refers to the resistance of

- (a) brushes
- (b) field
- (c) armature
- (d) load

Ans: b

75. To achieve sparkless commutation brushes of a D.C. generator are rocked ahead so as to bring them

- (a) just ahead of magnetic neutral axis
- (b) in magnetic neutral axis
- (c) just behind the magnetic neutral axis

Ans: a

76. Armature coil is short circuited by brushes when it lies

- (a) along neutral axis
- (b) along field axis
- (c) in any of the above positions
- (d) in none of the above positions

Ans: a

77. A cumulatively compounded long shunt generator when operating as a motor would be

(a) cumulatively compounded long shunt

(b) differentially compounded long shunt

(c) cumulatively compounded short shunt

(d) differentially compounded short shunt

Ans: b

78. To avoid formation of grooves in the commutator of a D.C. machine

(a) the brushes of opposite polarity should track each other

(b) the brushes of same polarity should track each other

(c) brush position has no effect on the commutator grooving

Ans: a

79. The following constitute short-circuit in the armature winding.

(a) Insulation failure between two commutator bars

(b) Insulation failure between two turns of a coil

(c) Two or more turns of the same coil getting grounded

(d) All of the above

Ans: d

80. The rapid wear of brushes takes place due to

(a) abrasion from dust

(b) excessive spring pressure

(c) rough commutator bars

(d) high mica insulation between commutator bars

(e) all of the above factors

Ans: e

81. Number of tapplings for each equalizer ring is equal to

(a) number of pole pairs

(b) number of poles

(c) number of parallel paths

(d) number of commutator segments

Ans: a

82. A D.C. generator can be considered as

(a) rectifier

- (b) primemover
- (c) rotating amplifier
- (d) power pump

Ans: c

83. In any rotating machine that part which houses the conductors and in which e.m.f. induced is to be utilised is called

- (a) rotor
- (b) stator
- (c) field
- (d) armature

Ans: d

84. In a D.C. machine stray loss is the sum of

- (a) total copper loss and mechanical loss
- (b) armature copper loss and iron loss
- (c) shunt field copper loss and mechanical loss
- (d) iron loss and mechanical loss

Ans: d

85. Lap winding is composed of

- (a) any even number of conductors
- (b) any odd number of conductors
- (c) that even number which is exact multiple of poles + 2
- (d) that even number which is exact multiple of poles

Ans: a

86. In a D.C. generator in case the resistance of the field winding is increased, then output voltage will

- (a) increase
- (b) decrease
- (c) remain unaffected
- (d) fluctuate heavily

Ans: b

87. An exciter for a turbo generator is a

- (a) separately excited generator
- (b) shunt generator
- (c) series generator
- (d) compound generator

Ans: b

88. In case of a flat compounded generator

- (a) voltage generated is less than the rated voltage
- (b) generated voltage is proportional to the load on the generator
- (c) voltage remains constant irrespective of the load
- (d) speed varies in proportion to the load on the generator

Ans: c

89. Which of the following generator will have negligible terminal voltage while running or no-load ?

- (a) Series generator
- (b) Shunt generator
- (c) Compound generator
- (d) Separately excited generator

Ans: a

90. Which of the following D.C. generators will be in a position to build up without any residual magnetism in the poles ?

- (a) Series generator
- (b) Shunt generator
- (c) Compound generator
- (d) None of the above

Ans: d

91. In over compounded generator, full load terminal voltage is

- (a) almost zero
- (b) less than no-load terminal voltage
- (c) more than no-load terminal voltage
- (d) equal to no-load terminal voltage

Ans: c

92. In a level compounded D.C. generator, full load terminal voltage is

- (a) negligibly low
- (b) equal to no-load terminal voltage
- (c) more than no-load terminal voltage
- (d) less than no-load terminal voltage

Ans: b

93. The terminal voltage of a D.C. shunt generator drops on load because of all of the following reasons except

- (a) armature reaction
- (b) armature resistance drop
- (c) field weakening due to armature reaction and armature
- (d) commutation

Ans: d

94. In a D.C. generator

- (a) external resistance = internal characteristic - armature reaction
- (b) internal characteristic = magnetisation characteristic - ohmic drop
- (c) external characteristic = magnetisation characteristic - ohmic drop - armature reaction
- (d) magnetisation characteristic = external characteristic

Ans: c

95. A sinusoidal voltage of 5 Hz is applied to the field of a shunt generator. The armature voltage wave

- (a) will be zero
- (b) will be of 5 Hz
- (c) will be of $5\sqrt{2}$ Hz
- (d) will be of $\sqrt{5}$ Hz

Ans: b

96. A 220 V D.C. generator is run at full speed without any excitation. The open circuit voltage will be

- (a) zero
- (b) about 2 V
- (c) about 50 V
- (d) 220 V

Ans: b

97. In a separately excited generator supplying rated load the armature reaction ,

- (a) is always present
- (b) is always absent
- (c) may be sometimes present
- (d) none of the above

Ans: a

98. If residual magnetism is present in a D.C. generator, the induced e.m.f. at zero speed will be

- (a) zero
- (b) small
- (c) the same as rated voltage
- (d) high

Ans: a

99. Armature reaction in a generator results in

- (a) demagnetisation of leading pole tip and magnetisation of trailing pole tip
- (b) demagnetisation of trailing pole tip and magnetisation of leading pole tip
- (c) demagnetising the centre of all poles
- (d) magnetising the centre of all poles

Ans: a

100. Following energized winding of a D.C. machine should not be opened as it would produce high inductive voltage which may be dangerous to personnel and may cause its own insulation failure.

- (a) Series field
- (b) Compensating field

(c) Inter pole field

(d) Shunt field

Ans: d

101. Wave winding is composed of

- (a) any even number of conductors
- (b) any odd number of conductors
- (c) that even number which is exact multiple of poles + 2

(d) that even number which is exact multiple of poles

Ans: c

102. The critical resistance of the D.C. generator is the resistance of

- (a) field
- (b) brushes
- (c) armature
- (d) load

Ans: a

103. When two D.C. series generators are running in parallel, an equalizer bar is used

- (a) to increase the speed and hence generated e.m.f.
- (b) to increase the series flux
- (c) so that two similar machines will pass approximately equal currents to the load
- (d) to reduce the combined effect of armature reaction of both machines

Ans: c

104. Which of the following generating machine will offer constant voltage on all loads ?

- (a) Self-excited generator
- (b) Separately excited generator
- (c) Level compounded generator .
- (d) All of the above

Ans: c

105. Which of the following generators will be preferred if they are required to be run in parallel ?

- (a) Shunt generators
- (b) Series generators
- (c) Compound generators
- (d) None of the above

Ans: a

106. Two generators are running in parallel. One of the generators may run as motor for which of the following reasons ?

- (a) The direction of that generator is reversed
- (b) The speed of that generator is increased

- (c) The field of that generator is weakened
- (d) That generator takes large share of loads

Ans: d

107. A D.C. generator works on the principle of

- (a) Lenz's law
- (b) Ohm's law
- (c) Faraday's law of electromagnetic induction
- (d) none of the above

Ans: c

108. A series generator can self-excite

- (a) only if the load current is zero
- (b) only if the load current is not zero
- (c) irrespective of the value of load current
- (d) none of the above

Ans: b

109. A shunt generator can self-excite

- (a) only if the resistance of the field circuit is less than critical value
- (b) only if the resistance of the field circuit is greater than critical value
- (c) irrespective of the value of the resistance in the field circuit

Ans: a

110. The terminal voltage of a series generator is 150 V when the load current is 5 A. If the load current is increased to 10 A, the terminal voltage will be

- (a) 150 V
- (b) less than 150 V
- (c) greater than 150 V
- (d) none of the above

Ans: c

111. The open circuit voltage of a compound generator is 250 V. At full load the terminal voltage

- (a) will be less than 250 V
- (b) will always be 250 V
- (c) may be greater or less than 250 V

(d) none of the above

Ans: c

112. Two D.C. shunt generators, each with armature resistance of 0.02 ohm and field resistance of 50 ohm run in parallel and supply a total current of 1000 amperes to the load

circuit. If their e.m.fs. are 270 V and 265 V, their bus bar voltage will be

(a) 270 V

(b) 267.5 V

(c) 265 V

(d) 257.4 V

Ans: b

113. The essential condition for parallel operation of two D.C. generators is that they have

(a) same kW rating

(b) the same operation r.p.m.

(c) the same drooping voltage characteristics

(d) same percentage regulation

Ans: c

114. When two D.C. generators are running in parallel an equalizer bar is used

(a) to increase the series flux

(b) to increase the generated e.m.f.

(c) to reduce the combined effect of armature reaction of both the machines

(d) so that the two identical machines will pass approximately equal currents to the load

Ans: d

115. With a D.C. generator which of the following regulation is preferred ?

(a) 100% regulation

(b) infinite regulation

(c) 50% regulation

(d) 1% regulation

Ans: d

116. Which generator would you prefer for feeding long D.C. transmission lines ?

(a) Series generator

- (b) Shunt generator
- (c) Over compound generator
- (d) Flat compound generator

Ans: c

117. In a D.C. generator the critical resistance can be increased by

- (a) increasing its field resistance
- (b) decreasing its field resistance
- (c) increasing its speed
- (d) decreasing its speed

Ans: c

118. The number of armature parallel paths in a two-pole D.C. generator having duplex lap winding is

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

Ans: b

119. For both lap and wave windings, there are as many commutator bars as the number of

- (a) slots
- (b) armature conductors
- (c) winding elements
- (d) poles

Ans: c

120. The series field of a short-shunt D.C. generator is excited by

- (a) external current
- (b) armature current
- (c) shunt current
- (d) load current

Ans: d

121. As a result of armature reaction, the reduction in the total mutual air gap flux in a D.C. generator is approximately

- (a) 40 percent

- (b) 25 percent
- (c) 10 percent
- (d) 5 percent

Ans: d

122. Shunt generators are most suited for stable parallel operation because of their

- (a) rising voltage characteristics
- (b) identical voltage characteristics
- (c) drooping voltage characteristics
- (d) linear voltage characteristics

Ans: c

123. The main factor which leads to unstable parallel operation of flat and over compounded generators is

- (a) their rising voltage characteristics
- (b) unequal number of turns in their series field windings
- (c) unequal speed regulation of their primemovers
- (d) unequal series field resistances

Ans: a

124. If a self excited D.C. generator after being installed, fails to build up on its first trial the first thing to do is to

- (a) reverse the field connections
- (b) increase the field resistance
- (c) increase the speed of primemover
- (d) check armature insulation resistance

Ans: a

2.DC MOTOR

1. No-load speed of which of the following motor will be highest ?

- (a) Shunt motor
- (b) Series motor
- (c) Cumulative compound motor
- (d) Differentiate compound motor

Ans: b

2. The direction of rotation of a D.C. series motor can be changed by
- (a) interchanging supply terminals
 - (b) interchanging field terminals
 - (c) either of (a) and (b) above
 - (d) None of the above

Ans: b

3. Which of the following application requires high starting torque ?

- (a) Lathe machine
- (b) Centrifugal pump
- (c) Locomotive
- (d) Air blower

Ans: c

4. If a D.C. motor is to be selected for conveyors, which motor would be preferred ?

- (a) Series motor
- (b) Shunt motor
- (c) Differentially compound motor
- (d) Cumulative compound motor

Ans: a

5. Which D.C. motor will be preferred for machine tools ?

- (a) Series motor
- (b) Shunt motor
- (c) Cumulative compound motor
- (d) Differential compound motor

Ans: b

6. Differentially compound D.C. motors can find applications requiring

- (a) high starting torque
- (b) low starting torque
- (c) variable speed
- (d) frequent on-off cycles

Ans: b

7. Which D.C. motor is preferred for elevators ?

- (a) Shunt motor
- (b) Series motor
- (c) Differential compound motor
- (d) Cumulative compound motor

Ans: d

8. According to Fleming's left-hand rule, when the forefinger points in the direction of the field or flux, the middle finger will point in the direction of

- (a) current in the conductor
- (b) direction of conductor
- (c) resultant force on conductor
- (d) none of the above

Ans: a

9. If the field of a D.C. shunt motor gets opened while motor is running

- (a) the speed of motor will be reduced %
- (b) the armature current will reduce
- (c) the motor will attain dangerously high speed
- (d) the motor will continue to run at constant speed

Ans: c

10. Starters are used with D.C. motors because

- (a) these motors have high starting torque
- (b) these motors are not self-starting
- (c) back e.m.f. of these motors is zero initially
- (d) to restrict armature current as there is no back e.m.f. while starting

Ans: d

11. In D.C. shunt motors as load is reduced

- (a) the speed will increase abruptly
- (b) the speed will increase in proportion to reduction in load
- (c) the speed will remain almost/constant
- (d) the speed will reduce

Ans: c

12. A D.C. series motor is that which

- (a) has its field winding consisting of thick wire and less turns

- (b) has a poor torque
- (c) can be started easily without load
- (d) has almost constant speed

Ans: a

13. For starting a D.C. motor a starter is required because

- (a) it limits the speed of the motor
- (b) it limits the starting current to a safe value
- (c) it starts the motor
- (d) none of the above

Ans: b

14. The type of D.C. motor used for shears and punches is

- (a) shunt motor
- (b) series motor
- (c) differential compound D.C. motor
- (d) cumulative compound D.C. motor

Ans: d

15. If a D.C. motor is connected across the A.C. supply it will

- (a) run at normal speed
- (b) not run
- (c) run at lower speed
- (d) burn due to heat produced in the field winding by eddy currents

Ans: d

16. To get the speed of D.C. motor below the normal without wastage of electrical energy, is used.

- (a) Ward Leonard control
- (b) rheostatic control
- (c) any of the above method
- (d) none of the above method

Ans: a

17. When two D.C. series motors are connected in parallel, the resultant speed is

- (a) more than the normal speed
- (b) less than the normal speed

(c) normal speed

(d) zero

Ans: c

18. The speed of a D.C. shunt motor more than its full-load speed can be obtained by

(a) decreasing the field current

(b) increasing the field current

(c) decreasing the armature current

(d) increasing the armature current

Ans: a

19. In a D.C. shunt motor, speed is

(a) independent of armature current

(b) directly proportional to the armature current

(c) proportional to the square of the current

(d) inversely proportional to the armature current

Ans: a

20. A direct on line starter is used: for starting motors

(a) up to 5 H.P.

(b) up to 10 H.P.

(c) up to 15 H.P.

(d) up to 20 H.P.

Ans: a

21. What will happen if the back e.m.f. of a D.C. motor vanishes suddenly?

(a) The motor will stop

(b) The motor will continue to run

(c) The armature may burn

(d) The motor will run noisy

Ans: c

22. In case of D.C. shunt motors the speed is dependent on back e.m.f. only because

(a) back e.m.f. is equal to armature drop

(b) armature drop is negligible

(c) flux is proportional to armature current

(d) flux is practically constant in D.C. shunt motors

Ans: d

23. In a D.C. shunt motor, under the conditions of maximum power, the current in the armature will be

- (a) almost negligible
- (b) rated full-load current
- (c) less than full-load current

(d) more than full-load current

Ans: d

24. These days D.C. motors are widely used in

- (a) pumping sets
- (b) air compressors
- (c) electric traction
- (d) machine shops

Ans: c

25. By looking at which part of the motor, it can be easily confirmed that a particular motor is D.C. motor?

- (a) Frame
- (b) Shaft
- (c) Commutator
- (d) Stator

Ans: c

26. In which of the following applications D.C. series motor is invariably used?

- (a) Starter for a car
- (b) Drive for a water pump
- (c) Fan motor
- (d) Motor operation in A.C. or D.C.

Ans: a

27. In D.C. machines fractional pitch winding is used

- (a) to improve cooling
- (b) to reduce copper losses

- (c) to increase the generated e.m.f.
- (d) to reduce the sparking

Ans: d

28. A three point starter is considered suitable for

- (a) shunt motors
- (b) shunt as well as compound motors
- (c) shunt, compound and series motors
- (d) all D.C. motors

Ans: b

29. In case-the conditions for maximum power for a D.C. motor are established, the efficiency of the motor will be

- (a) 1
- (b) around 90%

- (c) anywhere between 75% and 90%
- (d) less than 50%

Ans: d

30. The ratio of starting torque to full-load torque is least in case of

- (a) series motors
- (b) shunt motors
- (c) compound motors
- (d) none of the above

Ans: b

32. In D.C. motor which of the following can sustain the maximum temperature rise?

- (a) Slip rings
- (b) Commutator
- (c) Field winding
- (d) Armature winding

Ans: c

33. Which of the following law/rule can he used to determine the direction of rotation of D.C. motor ?

- (a) Lenz's law

- (b) Faraday's law
- (c) Coloumb's law
- (d) Fleming's left-hand rule

Ans: d

34. Which of the following load normally needs starting torque more than the rated torque?

- (a) Blowers
- (b) Conveyors
- (c) Air compressors
- (d) Centrifugal pumps

Ans: b

35. The starting resistance of a D.C. motor is generally

- (a) low
- (b) around 500 Ω
- (c) 1000 Ω
- (d) infinitely large

Ans: a

36. The speed of a D.C. series motor is

- (a) proportional to the armature current
- (b) proportional to the square of the armature current
- (c) proportional to field current
- (d) inversely proportional to the armature current

Ans: d

37. In a D.C. series motor, if the armature current is reduced by 50%, the torque of the motor will be equal

to

- (a) 100% of the previous value
- (b) 50% of the previous value
- (c) 25% of the previous value
- (d) 10% of the previous value
- (e) none of the above

Ans: c

38. The current drawn by the armature of D.C. motor is directly proportional to

- (a) the torque required
- (b) the speed of the motor
- (c) the voltage across the terminals
- (d) none of the above

Ans: a

39. The power mentioned on the name plate of an electric motor indicates

- (a) the power drawn in kW
- (b) the power drawn in kVA
- (c) the gross power
- (d) the output power available at the shaft

Ans: d

40. Which D.C. motor has got maximum self loading property?

- (a) Series motor
- (b) Shunt motor
- (c) Cumulatively compounded motor
- (d) Differentially compounded motor

Ans: d

41. Which D.C. motor will be suitable alongwith flywheel for intermittent light and heavy loads?

- (a) Series motor
- (b) Shunt motor
- (c) Cumulatively compounded motor
- (d) Differentially compounded motor

Ans: c

42. If a D.C. shunt motor is working at no load and if shunt field circuit suddenly opens

- (a) nothing will happen to the motor
- (b) this will make armature to take heavy current, possibly burning it
- (c) this will result in excessive speed, possibly destroying armature due to excessive centrifugal stresses
- (d) motor will run at very slow speed

Ans: c

43. D.C. series motors are used
- (a) where load is constant
 - (b) where load changes frequently
 - (c) where constant operating speed is needed
 - (d) in none of the above situations.

Ans: d

44. For the same H.P. rating and full load speed, following motor has poor starting torque
- (a) shunt
 - (b) series
 - (c) differentially compounded
 - (d) cumulatively compounded

Ans: c

45. In case of conductively compensated D.C. series motors, the compensating winding is provided

- (a) as separately wound unit
- (b) in parallel with armature winding
- (c) in series with armature winding
- (d) in parallel with field winding

Ans: c

46. Sparking at the commutator of a D.C. motor may result in

- (a) damage to commutator segments
- (b) damage to commutator insulation
- (c) increased power consumption
- (d) all of the above

Ans: d

47. Which of the following motor is preferred for operation in highly explosive atmosphere ?

- (a) Series motor
- (b) Shunt motor
- (c) Air motor
- (d) Battery operated motor

Ans: c

48. If the supply voltage for a D.C. motor is increased, which of the following will decrease ?

- (a) Starting torque
- (b) Operating speed
- (c) Full-load current
- (d) All of the above

Ans: c

49. Which one of the following is not the function of pole shoes in a D.C. machine ?

- (a) To reduce eddy current loss
- (b) To support the field coils
- (c) To spread out flux for better uniformity
- (d) To reduce the reluctance of the magnetic path

Ans: a

50. The mechanical power developed by a shunt motor will be maximum when the ratio of back e.m.f. to applied voltage is

- (a) 4.0
- (b) 2.0
- (c) 1.0
- (d) 0.5

Ans: d

51. The condition for maximum power in case of D.C. motor is

- (a) back e.m.f. = 2 x supply voltage
- (b) back e.m.f. = $\frac{1}{2}$ x supply voltage
- (c) supply voltage = $\frac{1}{2}$ x back e.m.f.
- (d) supply voltage = back e.m.f.

Ans: b

52. For which of the following applications a D.C. motor is preferred over an A.C. motor ?

- (a) Low speed operation
- (b) High speed operation
- (c) Variable speed operation
- (d) Fixed speed operation

Ans: c

53. In D.C. machines the residual magnetism is of the order of

- (a) 2 to 3 per cent
- (b) 10 to 15 per cent
- (c) 20 to 25 per cent

(d) 50 to 75 per cent

Ans: a

54. Which D.C. motor is generally preferred for cranes and hoists ?

- (a) Series motor
- (b) Shunt motor
- (c) Cumulatively compounded motor
- (d) Differentially compounded motor

Ans: a

55. Three point starter can be used for

- (a) series motor only
- (b) shunt motor only
- (c) compound motor only
- (d) both shunt and compound motor

Ans: d

56. Sparking, is discouraged in a D.C. motor because

- (a) it increases the input power consumption
- (b) commutator gets damaged
- (c) both (a) and (b)
- (d) none of the above

Ans: b

57. Speed control by Ward Leonard method gives uniform speed variation

- (a) in one direction
- (b) in both directions
- (c) below normal speed only
- (d) above normal speed only.

Ans: b

58. Flywheel is used with D.C. compound motor to reduce the peak demand by the motor, compound motor will have to be

- (a) level compounded
- (b) under compounded
- (c) cumulatively compounded
- (d) differentially compounded

Ans: c

59. Following motor is used where high starting torque and wide speed range control is required.

- (a) Single phase capacitor start
- (b) Induction motor
- (c) Synchronous motor
- (d) D.C. motor
- (e) None of the above

Ans: d

60. In a differentially compounded D.C. motor, if shunt field suddenly opens

- (a) the motor will first stop and then run in opposite direction as series motor
- (b) the motor will work as series motor and run at slow speed in the same direction
- (c) the motor will work as series motor and run at high speed in the same direction
- (d) the motor will not work and come to stop

Ans: a

61. Which of the following motor has the poorest speed regulation ?

- (a) Shunt motor
- (b) Series motor
- (c) Differential compound motor
- (d) Cumulative compound motor

Ans: b

62. Buses, trains, trolleys, hoists, cranes require high starting torque and therefore make use of

- (a) D.C. series motor
- (b) D.C. shunt motor
- (c) induction motor

(d) all of above motors

Ans: a

63. As -the load is increased the speed of D.C. shunt motor will

- (a) reduce slightly
- (b) increase slightly
- (c) increase proportionately
- (d) remains unchanged

Ans: a

64. The armature torque of the D.C. shunt motor is proportional to

- (a) field flux only
- (b) armature current only
- (c) both (a) and (b)
- (d) none of the above

Ans: b

65. Which of the following method of speed control of D.C. machine will offer minimum efficiency ?

- (a) Voltage control method
- (b) Field control method
- (c) Armature control method
- (d) All above methods

Ans: c

66. Usually wide and sensitive speed control is desired in case of

- (a) centrifugal pumps
- (b) elevators
- (c) steel rolling mills
- (d) colliery winders

Ans: d

67. The speed of a motor falls from 1100 r.p.m. at no-load to 1050 r.p.m. at rated load. speed regulation of the motor is

- (a) 2.36%
- (b) 4.76%

- (c) 6.77%
- (d) 8.84%

Ans: b

68. The armature voltage control of D.C. motor provides

- (a) constant torque drive
- (b) constant voltage drive
- (c) constant current drive
- (d) none of the above

Ans: a

69. As there is no back e.m.f. at the instant of starting a D.C. motor, in order to prevent a heavy current from flowing through the armature circuit

- (a) a resistance is connected in series with armature
- (b) a resistance is connected parallel to the armature
- (c) armature is temporarily open circuited
- (d) a high value resistor is connected across the field winding

Ans: a

70. The speed of a D.C. shunt motor can be increased by

- (a) increasing the resistance in armature circuit
- (b) increasing the resistance in field circuit
- (c) reducing the resistance in the field circuit
- (d) reducing the resistance in the armature circuit

Ans: b

71. If I_2 be the armature current, then speed of a D.C. shunt motor is

- (a) independent of I_a
- (b) proportional to I_a
- (c) varies as (I_a)
- (d) varies as I_a

Ans: a

72. In case the back e.m.f. and the speed of a D.C. motor are doubled, the torque developed by the motor will

- (a) remain unchanged
- (b) reduce to one-fourth value

- (c) increase four folds
- (d) be doubled

Ans: a

73. At the instant of starting when a D.C. motor is put on supply, it behaves like

- (a) a highly resistive circuit
- (b) a low resistance circuit
- (c) a capacitive circuit
- (d) none of the above

Ans: b

74. The speed of a D.C. motor can be varied by varying

- (a) field current
- (b) applied voltage
- (c) resistance in series with armature
- (d) any of the above

Ans: d

75. Which one of the following is not necessarily the advantage of D.C. motors over A.C. motors ?

- (a) Low cost
- (b) Wide speed range
- (c) Stability
- (d) High starting torque.

Ans: a

76. For a D.C. shunt motor if the excitation is changed

- (a) torque will remain constant
- (b) torque will change but power will remain constant
- (c) torque and power both will change
- (d) torque, power and speed, all will change

Ans: b

77. Which motor has the poorest speed control?

- (a) Differentially compounded motor
- (b) Cumulatively compounded motor
- (c) Shunt motor

(d) Series motor

Ans: d

78. The plugging gives the

- (a) zero torque braking
- (b) smallest torque braking
- (c) highest torque braking
- (d) none of the above

Ans: c

79. The armature voltage control of D.C. motor provides

- (a) constant voltage drive
- (b) constant current drive
- (c) constant torque drive
- (d) none of the above

Ans: c

80. If a D.C. motor designed for 40°C ambient temperature is to be used for 50°C ambient temperature, then the motor

- (a) of lower H.P. should be selected
- (b) of higher H.P. should be selected
- (c) can be used for 50°C ambient temperature also
- (d) is to be derated by a factor recommended by manufacturer and select the next higher H.P. motor

Ans: d

81. If the terminals of armature of D.C. motor are interchanged, this action will offer following kind of braking

- (a) regenerative
- (b) plugging
- (c) dynamic braking
- (d) none of the above
- (e) any of the above

Ans: b

82. 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

83. If the speed of a D.C. shunt motor is increased, the back e.m.f. of the motor will

(a) increase

(b) decrease

(c) remain same

(d) become zero

Ans: a

84. Why are the D.C. motors preferred for traction applications ?

(a) Torque and speed are inversely proportional to armature current

(b) Torque is proportional to armature current

(c) Torque is proportional to square root of armature current

(d) The speed is inversely proportional to the torque and the torque is proportional to square of armature current

Ans: d

85. Which of the following motors is usually used in house-hold refrigerators ?

(a) D.C. shunt motor

(b) D.C. series motor

(c) Single phase induction motor (split phase start or induction runmotor)

(d) Reluctance motor

(e) Synchronous motor

Ans: c

86. Which of the following motors is most suitable for signalling devices and many kinds of timers ?

(a) D.C. shunt motor

(b) D.C. series motor

(c) Induction motor

(d) Reluctance motor

Ans: d

87. Which motor should not be started on no-load ?

- (a) Series motor
- (b) Shunt motor
- (c) Cumulatively compounded motor
- (d) Differentially compounded motor.

Ans: a

88. Ward-Leonard control is basically a

- (a) voltage control method
- (b) field divertor method
- (c) field control method
- (d) armature resistance control method

Ans: a

89. For constant torque drive which speed control method is preferred ?

- (a) Field control
- (b) Armature voltage control
- (c) Shunt armature control
- (d) Mechanical loading system

Ans: b

90. In Ward-Leonard control the lower limit of speed is imposed by

- (a) residual magnetism of the generator
- (b) core losses of motor
- (c) mechanical losses of motor and generator together
- (d) all of the above

Ans: a

91. The main disadvantage of the Ward-Leonard control method is

- (a) high initial cost
- (b) high maintenance cost
- (c) low efficiency at high loads
- (d) all of the above

Ans: d

92. Regenerative method of braking is based on that

- (a) back e.m.f. is less than the applied voltage
- (b) back e.m.f. is equal to the applied voltage
- (c) back e.m.f. of rotor is more than the applied voltage
- (d) none of the above

Ans: b

93. The hysteresis loss in a D.C. machine least depends on

- (a) Frequency of magnetic reversals
- (b) Maximum value of flux density
- (c) Volume and grade of iron
- (d) Rate of flow of ventilating air

Ans: d

94. In a D.C. generator all of the following could be the effects of iron losses except

- (a) Loss of efficiency
- (b) Excessive heating of core
- (c) Increase in terminal voltage
- (d) Rise in temperature of ventilating air

Ans: c

95. The losses occurring in a D.C. generator are given below. Which loss is likely to have highest proportion at rated load of the generator ?

- (a) hysteresis loss
- (b) field copper loss
- (c) armature copper loss
- (d) eddy current loss

Ans: c

96. Which of the following loss in a D.C. generator varies significantly with the load current ?

- (a) Field copper loss
- (b) Windage loss
- (c) Armature copper loss
- (d) None of the above

Ans: c

97. Torque developed by a D.C. motor depends upon

- (a) magnetic field
- (b) active length of the conductor
- (c) current flow through the conductors
- (d) number of conductors
- (e) radius of armature
- (f) all above factors

Ans: f

98. D.C. shunt motors are used for driving

- (a) trains
- (b) cranes
- (c) hoists
- (d) machine tools

Ans: d

99. In a manual shunt motor starter

- (a) over load relay is connected in series and no volt relay in parallel with the load
- (b) over load relay is connected in parallel and no volt relay in series with the load
- (c) over load relay and no volt relay are both connected in series with the load
- (d) over load relay and no volt relay are both connected in parallel with the load

Ans: a

100. Which of the following steps is likely to result in reduction of hysteresis loss in a D.C. generator ?

- (a) Providing laminations in armature core
- (b) Providing laminations in stator
- (c) Using non-magnetic material for frame
- (d) Using material of low hysteresis co-efficient for armature core material

Ans: d

101. Which of the following loss in a D.C. generator is dissipated in the form of heat?

- (a) Mechanical loss
- (b) Core loss
- (c) Copper loss
- (d) All of the above

Ans: d

102. Which of the following losses are significantly reduced by laminating the core of a D.C. generator ?

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

Ans: b

103. The total losses in a well designed D.C. generator of 10 kW will be nearly

- (a) 100 W
- (b) 500 W
- (c) 1000 W
- (d) 1500 W

Ans: b

104. The condition for maximum efficiency for a D.C. generator is

- (a) eddy current losses = stray losses
- (b) hysteresis losses = eddy current losses
- (c) copper losses = 0
- (d) variable losses = constant losses

Ans: d

105. D.C. generators are normally designed for maximum efficiency around

- (a) full-load
- (b) rated r.p.m.
- (c) rated voltage
- (d) all of the above

Ans: a

106. In a D.C. generator, the iron losses mainly take place in

- (a) yoke
- (b) commutator
- (c) armature conductors
- (d) armature rotor

Ans: d

107. D.C. generators are installed near the load centres to reduce

- (a) iron losses
- (b) line losses
- (c) sparking
- (d) corona losses

Ans: b

108. The purpose of retardation test on D.C. shunt machines is to find out

- (a) stray losses
- (b) eddy current losses
- (c) field copper losses
- (d) windage losses

Ans: a

109. Which of the following tests will be suitable for testing two similar D.C. seriesmotors of large capacity ?

- (a) Swinburne's test
- (b) Hopkinson's test
- (c) Field test
- (d) Brake test

Ans: c

110. Hopkinson's test on D.C. machines is conducted at

- (a) no-load
- (b) part load
- (c) full-load
- (d) overload

Ans: c

111. During rheostat braking of D.C. series motors

- (a) motor is run as a generator
- (b) motor is reversed in direction
- (c) motor is run at reduced speed

Ans: a

112. For which types of D.C. motor, dynamic braking is generally used ?

- (a) Shunt motors
- (b) Series motors
- (c) Compound motors
- (d) All of the above

Ans: d

113. Which method of braking is generally used in elevators ?

- (a) Plugging
- (b) Regenerative braking
- (c) Rheostatic braking
- (d) None of the above

Ans: a

114. In variable speed motor

- (a) a stronger commutating field is needed at low speed than at high speed
- (b) a weaker commutating field is needed at low speed than at high speed
- (c) same commutating field is needed at low speed than at high speed
- (d) none of the above is correct

Ans: b

115. When the armature of a D.C. motor rotates, e.m.f. induced is

- (a) self-induced e.m.f.
- (b) mutually induced e.m.f.
- (c) back e.m.f.
- (d) none of the above

Ans: c

116. Where D.C. motor of H.P. 12 or more requires frequent starting, stopping, reversing and speed control

- (a) drum type controller is used
- (b) three point starter is used
- (c) four point starter is used
- (d) all above can be used

Ans: a

117. If a D.C. shunt motor is working at full load and if shunt field circuit suddenly opens

- (a) this will make armature to take heavy current, possibly burning it

(6) this will result in excessive speed, possibly destroying armature due to excessive centrifugal stresses

(c) nothing will happen to motor

(d) motor will come to stop

Ans: a

118. D.C. motor is to drive a load which has certain minimum value for most of the time and some peak value for short duration. We will select the

(a) series motor

(b) shunt motor

(c) compound motor

(d) any of the above

Ans: a

119. D.C. motor is to drive a load which is almost nil for certain part of the load cycle and peak value for short duration. We will select this

(a) series motor

(b) shunt motor

(c) compound motor

(d) any of the above

Ans: c

120. Which D.C. motor has got maximum self relieving property ?

(a) Series motor

(6) Shunt motor

(c) Cumulatively compounded motor

(d) Differentially compounded motor

Ans: a

121. In the D.C. motor the iron losses occur in

(a) the field

(b) the armature

(c) the brushes

(d) the commutator

Ans: b

122. The speed of a D.C. shunt motor is required to be more than full load speed. This is possible by

- (a) reducing the field current
- (b) decreasing the armature current
- (c) increasing the armature current
- (d) increasing the excitation current
- (e) none of the above methods

Ans: a

123. One D.C. motor drives another D.C. motor. The second D.C. motor when excited and driven

- (a) runs as a generator
- (b) does not run as a generator
- (c) also runs as a motor comes to stop after sometime

Ans: a

3. TRANSFORMERS

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

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

Ans: c

2. 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

3. A transformer core is laminated to

- (a) reduce hysteresis loss
- (b) reduce eddy current losses

- (c) reduce copper losses
- (d) reduce all above losses

Ans: b

4. 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

Ans: d

5. 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

Ans: b

6. The path of a magnetic flux in a transformer should have

- (a) high resistance
- (b) high reluctance
- (c) low resistance
- (d) low reluctance

Ans: d

7. 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

Ans: c

8. The dielectric strength of transformer oil is expected to be

- (a) 1kV
- (b) 33 kV

- (c) 100 kV
- (d) 330 kV

Ans: b

9. Sumpner's test is conducted on trans-formers to determine

- (a) temperature
- (b) stray losses
- (c) all-day efficiency
- (d) none of the above

Ans: a

10. 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

Ans: a

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

Ans: d

12. 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°

Ans: a

13. 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

Ans: c

14. Which of the following is not a part of transformer installation ?

(a) Conservator

(b) Breather

(c) Buchholz relay

(d) Exciter

Ans: d

15. 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

Ans: b

16. 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

Ans: a

17. A transformer transforms

(a) voltage

(b) current

(c) power

(d) frequency

Ans: c

18. 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 flu

is zero

(d) none of the above

Ans: c

19. 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

Ans: c

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

Ans: b

21. 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

Ans: b

22. 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

Ans: c

23. 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

Ans: c

24. 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°

Ans: d

25. In a transformer routine efficiency depends upon

- (a) supply frequency
- (b) load current
- (c) power factor of load
- (d) both (b) and (c)

Ans: d

26. 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

Ans: c

27. Natural oil cooling is used for transformers upto a rating of

- (a) 3000 kVA
- (b) 1000 kVA
- (c) 500 kVA
- (d) 250 kVA

Ans: a

28. Power transformers are designed to have maximum efficiency at

- (a) nearly full load
- (b) 70% full load
- (c) 50% full load

(d) no load

Ans: a

29. 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

Ans: b

30. 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

31. 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

Ans: d

32. 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

Ans: a

33. 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

Ans: a

34. 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: c

35. The power transformer is a constant

- (a) voltage device
- (b) current device
- (c) power device
- (d) main flux device

Ans: d

36. 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

37. 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

Ans: b

38. 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

Ans: b

39. 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

Ans: d

40. In a transformer the tapings are generally provided on

- (a) primary side
- (b) secondary side
- (c) low voltage side
- (d) high voltage side

Ans: c

41. 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

Ans: a

42. 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.

Ans: b

43. The chemical used in breather is

- (a) asbestos fibre

- (b) silica sand
- (c) sodium chloride
- (d) silica gel

Ans: d

44. An ideal transformer has infinite values of primary and secondary inductances. The statement is

- (a) true
- (b) false

Ans: b

45. The transformer ratings are usually expressed in terms of

- (a) volts
- (b) amperes
- (c) kW
- (d) kVA

Ans: d

46. The noise resulting from vibrations of laminations set by magnetic forces, is termed as

- (a) magnetostriction
- (b) boo
- (c) hum
- (d) zoom

Ans: c

47. Hysteresis loss in a transformer varies as $C B_{\max}^n$ (where B_{\max} = maximum flux density)

- (a) B_{\max}
- (b) B_{\max}^{1-6}
- (c) B_{\max}^{1-83}
- (d) B_{\max}

Ans: b

48. Material used for construction of transformer core is usually

- (a) wood
- (b) copper
- (c) aluminium
- (d) silicon steel

Ans: d

49. 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

Ans: a

50. The function of conservator in a transformer is

- (a) to project 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

Ans: d

51. The highest voltage for transmitting electrical power in India is

- (a) 33 kV.
- (b) 66 kV
- (c) 132 kV
- (d) 400 kV

Ans: d

52. In a transformer the resistance between its primary and secondary is

- (a) zero
- (b) 1 ohm
- (c) 1000 ohms
- (d) infinite

Ans: d

53. A transformer oil must be free from

- (a) sludge
- (b) odour
- (c) gases
- (d) moisture

Ans: d

54. A Buchholz relay can be installed on

- (a) auto-transformers
- (b) air-cooled transformers
- (c) welding transformers
- (d) oil cooled transformers

Ans: d

55. 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

Ans: d

56. 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

Ans: d

57. Distribution transformers are generally designed for maximum efficiency around

- (a) 90% load
- (b) zero load
- (c) 25% load

(d) 50% load

Ans: d

58. 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

Ans: c

59. 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

Ans: b

60. 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

61. 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

Ans: a

62. 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

Ans: a

63. Which of the following does not change in an ordinary transformer ?

(a) Frequency

(b) Voltage

(c) Current

(d) Any of the above

Ans: a

64. 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

Ans: c

65. 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

Ans: a

66. The path of the magnetic flux in transformer should have

- (a) high reluctance
- (b) low reactance
- (c) high resistance
- (d) low resistance

Ans: b

67. Noise level test in a transformer is a

- (a) special test
- (b) routine test
- (c) type test
- (d) none of the above

Ans: c

68. 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

Ans: c

69. A transformer can have zero voltage regulation at

- (a) leading power factor
- (b) lagging power factor
- (c) unity power factor
- (d) zero power factor

Ans: a

70. 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

Ans: a

71. Harmonics in transformer result in

- (a) increased core losses
- (b) increased I²R losses
- (c) magnetic interference with communication circuits
- (d) all of the above

Ans: d

72. The core used in high frequency transformer is usually

- (a) copper core
- (b) cast iron core
- (c) air core
- (d) mild steel core

Ans: c

73. 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

Ans: d

1.74. 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

Ans: c

L.75. Silicon steel used in laminations mainly reduces

- (a) hysteresis loss
- (b) eddy current losses
- (c) copper losses
- (d) all of the above

Ans: a

76. 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

77. 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

.78. 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

79. 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

Ans: c

80. 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

Ans: d

81. 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

Ans: a

82. 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
- (e) none of the above

Ans: a

83. 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

Ans: d

84. 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

(c) secondary voltage remains constant

Ans: c

85. 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

86. 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

87. 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

88. 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

89. 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

Ans: a

90. The transformer laminations are insulated from each other by

- (a) mica strip
- (b) thin coat of varnish
- (c) paper
- (d) any of the above

Ans: b

91. Which type of winding is used in 3phase shell-type transformer ?

- (a) Circular type
- (b) Sandwich type
- (c) Cylindrical type
- (d) Rectangular type

Ans: b

92. 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

Ans: a

93. Open circuit test on transformers is conducted to determine

- (a) hysteresis losses
- (b) copper losses
- (c) core losses

(d) eddy current losses

Ans: c

94. Short circuit test on transformers is conducted to determine

(a) hysteresis losses

(b) copper losses

(c) core losses

(d) eddy current losses

Ans: b

95. 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.

Ans: b

96. The transformer oil should have volatility and

(a) low,low

(b) high,high

(c) low,high

(d) high,low

Ans: a

97. 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

Ans: d

98. 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

Ans: d

99. 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

Ans: d

100. Natural air cooling is generally restricted for transformers up to

(a) 1.5 MVA

(b) 5 MVA

(c) 15 MVA

(d) 50 MVA

Ans: a

101. A shell-type transformer has

(a) high eddy current losses

(b) reduced magnetic leakage

(c) negligibly hysteresis losses

(d) none of the above

Ans: b

102. 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

Ans: c

103. A transformer transforms

(a) voltage

(b) current

(c) current and voltage

(d) power

Ans: d

104. Which of the following is not the standard voltage for power supply in India ?

- (a) 11kV
- (b) 33kV
- (c) 66 kV
- (d) 122 kV

Ans: d

105. 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

Ans: a

106. 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

Ans: a

107. 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

Ans: c

108. 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

Ans: a

109. 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

Ans: a

110. Which of the following statements regarding an idel 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

Ans: d

111 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

Ans: a

112. In a transformer the resistance between its primary and secondary should be

- (a) zero
- (b) 10 Q
- (c) 1000 Q
- (d) infinity

Ans: d

113. 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

Ans: a

114. 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

Ans: d

115. 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

Ans: b

116. 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

Ans: a

117. 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

Ans: b

118. Which of the following insulating materials can withstand the highest temperature safely ?

- (a) Cellulose
- (b) Asbestos
- (c) Mica
- (d) Glass fibre

Ans: c

119. Which of the following parts of a transformer is visible from outside ?

- (a) Bushings
- (b) Core
- (c) Primary winding
- (d) Secondary winding

Ans: a

120. The noise produced by a transformer is termed as

- (a) zoom
- (b) hum
- (c) ringing
- (d) buzz

Ans: b

121. 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

Ans: b

122. 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

Ans: d

123. If a transformer is continuously operated the maximum temperature rise will occur in

- (a) core
- (b) windings
- (c) tank
- (d) any of the above

Ans: b

124. The hum in a transformer is mainly attributed to

- (a) load changes
- (b) oil in the transformer
- (c) magnetostriction
- (d) mechanical vibrations

Ans: c

125. 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

Ans: c

126. 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

Ans: a

127. 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

Ans: c

128. 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

129. 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

Ans: c

130. 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

Ans: c

131. 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

Ans: a

132. 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

Ans: a

133. Minimum voltage regulation occurs when the power factor of the load is

- (a) unity
- (b) lagging
- (c) leading
- (d) zero

Ans: c

134. 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

Ans: a

135. 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

Ans: c

4. THREE PHASE INDUCTION MOTORS

1. Which of the following component is usually fabricated out of silicon steel ?

- (a) Bearings

- (b) Shaft
- (c) Statorcore
- (d) None of the above

Ans: c

2. The frame of an induction motor is usually made of

- (a) silicon steel
- (b) cast iron
- (c) aluminium
- (d) bronze

Ans: b

3. The shaft of an induction motor is made of

- (a) stiff
- (b) flexible
- (c) hollow
- (d) any of the above

Ans: a

4. The shaft of an induction motor is made of

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

Ans: c

5. In an induction motor, no-load the slip is generally

- (a) less than 1%
- (b) 1.5%
- (c) 2%
- (d) 4%

Ans: a

6. In medium sized induction motors, the slip is generally around

- (a) 0.04%
- (b) 0.4%

- (c) 4%
- (d) 14%

Ans: c

7. In squirrel cage induction motors, the rotor slots are usually given slight skew in order to

- (a) reduce windage losses
- (b) reduce eddy currents
- (c) reduce accumulation of dirt and dust
- (d) reduce magnetic hum

Ans: d

8. In case the air gap in an induction motor is increased

- (a) the magnetising current of the rotor will decrease
- (b) the power factor will decrease
- (c) speed of motor will increase
- (d) the windage losses will increase

Ans: b

9. Slip rings are usually made of

- (a) copper
- (b) carbon
- (c) phosphor bronze
- (d) aluminium

Ans: c

10. A 3-phase 440 V, 50 Hz induction motor has 4% slip. The frequency of rotor e.m.f. will be

- (a) 200 Hz
- (b) 50 Hz
- (c) 2 Hz

(d) 0.2 Hz

Ans: c

11. In N_s is the synchronous speed and s the slip, then actual running speed of an induction motor will be

- (a) N_s
- (b) $s.N$,
- (c) $(1-s)N_s$
- (d) $(N_s-1)s$

Ans: c

The efficiency of an induction motor can be expected to be nearly

- (a) 60 to 90%
- (b) 80 to 90%
- (c) 95 to 98%
- (d) 99%

Ans: b

13. The number of slip rings on a squirrel cage induction motor is usually

- (a) two
- (b) three
- (c) four
- (d) none

Ans: d

14. The starting torque of a squirrel-cage induction motor is

- (a) low
- (b) negligible
- (c) same as full-load torque
- (d) slightly more than full-load torque

Ans: a

15. A double squirrel-cage induction motor has

- (a) two rotors moving in opposite direction
- (b) two parallel windings in stator
- (c) two parallel windings in rotor
- (d) two series windings in stator

Ans: c

16. Star-delta starting of motors is not possible in case of

- (a) single phase motors
- (b) variable speed motors

(c) low horse power motors

(d) high speed motors

Ans: a

17. The term 'cogging' is associated with

(a) three phase transformers

(b) compound generators

(c) D.C. series motors

(d) induction motors

Ans: d

18. In case of the induction motors the torque is

(a) inversely proportional to (V_{slip})

(b) directly proportional to $(slip)^2$

(c) inversely proportional to slip

(d) directly proportional to slip

Ans: d

19. An induction motor with 1000 r.p.m. speed will have

(a) 8 poles

(b) 6 poles

(c) 4 poles

(d) 2 poles

Ans: b

20. The good power factor of an induction motor can be achieved if the average flux density in the air gap is

(a) absent

(b) small

(c) large

(d) infinity

Ans: b

21. An induction motor is identical to

(a) D.C. compound motor

(b) D.C. series motor

- (c) synchronous motor
- (d) asynchronous motor

Ans: d

22. The injected e.m.f. in the rotor of induction motor must have

- (a) zero frequency
- (b) the same frequency as the slip frequency
- (c) the same phase as the rotor e.m.f.
- (d) high value for the satisfactory speed control

Ans: b

23. Which of the following methods is easily applicable to control the speed of the squirrel-cage induction motor ?

- (a) By changing the number of stator poles
- (b) Rotor rheostat control
- (c) By operating two motors in cascade
- (d) By injecting e.m.f. in the rotor circuit

Ans: a

24. The crawling in the induction motor is caused by

- (a) low voltage supply
- (b) high loads
- (c) harmonics developed in the motor
- (d) improper design of the machine
- (e) none of the above

Ans: c

25. The auto-starters (using three auto transformers) can be used to start cage induction motor of the following type

- (a) star connected only
- (b) delta connected only
- © (a) and (b) both
- (d) none of the above

Ans: c

26. The torque developed in the cage induction motor with autostarter is

- (a) k /torque with direct switching
- (b) $K \times$ torque with direct switching
- (c) $K^2 \times$ torque with direct switching
- (d) k^2 /torque with direct switching

Ans: c

27. When the equivalent circuit diagram of double squirrel-cage induction motor is constructed the two cages can be considered

- (a) in series
- (b) in parallel
- (c) in series-parallel
- (d) in parallel with stator

Ans: b

28. It is advisable to avoid line-starting of induction motor and use starter because

- (a) motor takes five to seven times its full load current
- (b) it will pick-up very high speed and may go out of step
- (c) it will run in reverse direction
- (d) starting torque is very high

Ans: a

29. Stepless speed control of induction motor is possible by which of the following methods ?

- (a) e.m.f. injection in rotor circuit
- (b) Changing the number of poles
- (c) Cascade operation
- (d) None of the above

Ans: b

30. Rotor rheostat control method of speed control is used for

- (a) squirrel-cage induction motors only
- (b) slip ring induction motors only
- (c) both (a) and (b)
- (d) none of the above

Ans: b

31. In the circle diagram for induction motor, the diameter of the circle represents
- (a) slip
 - (b) rotor current
 - (c) running torque
 - (d) line voltage

Ans: b

32. For which motor the speed can be controlled from rotor side ?
- (a) Squirrel-cage induction motor
 - (b) Slip-ring induction motor
 - (c) Both (a) and (b)
 - (d) None of the above

Ans: b

33. If any two phases for an induction motor are interchanged
- (a) the motor will run in reverse direction
 - (b) the motor will run at reduced speed
 - (c) the motor will not run
 - (d) the motor will burn

Ans: a

34. An induction motor is
- (a) self-starting with zero torque
 - (b) self-starting with high torque
 - (c) self-starting with low torque
 - (d) non-self starting

Ans: c

35. The maximum torque in an induction motor depends on
- (a) frequency
 - (b) rotor inductive reactance
 - (c) square of supply voltage
 - (d) all of the above

Ans: d

36. In three-phase squirrel-cage induction motors
- (a) rotor conductor ends are short-circuited through slip rings

- (b) rotor conductors are short-circuited through end rings
- (c) rotor conductors are kept open
- (d) rotor conductors are connected to insulation

Ans: b

37. In a three-phase induction motor, the number of poles in the rotor winding is always

- (a) zero
- (b) more than the number of poles in stator
- (c) less than number of poles in stator
- (d) equal to number of poles in stator

Ans: d

38. DOL starting of induction motors is usually restricted to

- (a) low horsepower motors
- (b) variable speed motors
- (c) high horsepower motors
- (d) high speed motors

Ans: a

39. The speed of a squirrel-cage induction motor can be controlled by all of the following except

- (a) changing supply frequency
- (b) changing number of poles
- (c) changing winding resistance
- (d) reducing supply voltage

Ans: c

40. The 'crawling' in an induction motor is caused by

- (a) high loads
- (b) low voltage supply
- (c) improper design of machine
- (d) harmonics developed in the motor

Ans: d

41. The power factor of an induction motor under no-load conditions will be closer to

- (a) 0.2 lagging
- (b) 0.2 leading

- (c) 0.5 leading
- (d) unity

Ans: a

42. The 'cogging' of an induction motor can be avoided by

- (a) proper ventilation
- (b) using DOL starter
- (c) auto-transformer starter
- (d) having number of rotor slots more or less than the number of stator slots (not equal)

Ans: d

43. If an induction motor with certain ratio of rotor to stator slots, runs at $1/7$ of the normal speed, the phenomenon will be termed as

- (a) humming
- (b) hunting
- (c) crawling
- (d) cogging

Ans: c

44. Slip of an induction motor is negative when

- (a) magnetic field and rotor rotate in opposite direction
- (b) rotor speed is less than the syn-chronous speed of the field and are in the same direction
- (c) rotor speed is more than the syn-chronous speed of the field and are in the same direction
- (d) none of the above

Ans: c

45. Size of a high speed motor as compared to low speed motor for the same H.P. will be

- (a) bigger
- (b) smaller
- (c) same

(d) any of the above

Ans: b

46. A 3-phase induction motor stator delta connected, is carrying full load and one of its

fuses blows out. Then the motor

- (a) will continue running burning its one phase
- (b) will continue running burning its two phases
- (c) will stop and carry heavy current causing permanent damage to its winding
- (d) will continue running without any harm to the winding

Ans: a

47. A 3-phase induction motor delta connected is carrying too heavy load and one of its fuses blows out. Then the motor

- (a) will continue running burning its one phase
- (b) will continue running burning its two phase
- (c) will stop and carry heavy current causing permanent damage to its winding
- (d) will continue running without any harm to the winding

Ans: c

48. Low voltage at motor terminals is due to

- (a) inadequate motor wiring
- (b) poorly regulated power supply
- (c) any one of the above
- (d) none of the above

Ans: c

49. In an induction motor the relationship between stator slots and rotor slots is that

- (a) stator slots are equal to rotor slots
- (b) stator slots are exact multiple of rotor slots
- (c) stator slots are not exact multiple of rotor slots
- (d) none of the above

Ans: c

50. Slip ring motor is recommended where

- (a) speed control is required
- (b) frequent starting, stopping and reversing is required
- (c) high starting torque is needed
- (d) all above features are required

Ans: d

51. As load on an induction motor goes on increasing

- (a) its power factor goes on decreasing
- (b) its power factor remains constant
- (c) its power factor goes on increasing even after full load
- (d) its power factor goes on increasing upto full load and then it falls again

Ans: d

52. If a 3-phase supply is given to the stator and rotor is short circuited rotor will move

- (a) in the opposite direction as the direction of the rotating field
- (b) in the same direction as the direction of the field
- (c) in any direction depending upon phase sequence of supply

Ans: b

53. It is advisable to avoid line starting of induction motor and use starter because

- (a) it will run in reverse direction
- (b) it will pick up very high speed and may go out of step
- (c) motor takes five to seven times its fullload current
- (d) starting torque is very high

Ans: c

54. The speed characteristics of an induction motor closely resemble the speedload characteristics of which of the following machines

- (a) D.C. series motor
- (b) D.C. shunt motor
- (c) universal motor
- (d) none of the above

Ans: b

55. Which type of bearing is provided in small induction motors to support the rotor shaft ?

- (a) Ball bearings
- (b) Cast iron bearings
- (c) Bush bearings
- (d) None of the above

Ans: a

56. A pump induction motor is switched on to a supply 30% lower than its rated voltage. The pump runs. What will eventually happen ? It will

- (a) stall after sometime
- (b) stall immediately
- (c) continue to run at lower speed without damage
- (d) get heated and subsequently get damaged

Ans: d

57 5 H.P., 50-Hz, 3-phase, 440 V, induction motors are available for the following r.p.m. Which motor will be the costliest ?

- (a) 730 r.p.m.
- (b) 960 r.p.m.
- (c) 1440 r.p.m.
- (d) 2880 r.p.m.

Ans: a

58. A 3-phase slip ring motor has

- (a) double cage rotor
- (b) wound rotor
- (c) short-circuited rotor
- (d) any of the above

Ans: b

59. The starting torque of a 3-phase squirrel cage induction motor is

- (a) twice the full load torque
- (b) 1.5 times the full load torque
- (c) equal to full load torque

Ans: b

60. Short-circuit test on an induction motor cannot be used to determine

- (a) windage losses
- (b) copper losses
- (c) transformation ratio
- (d) power scale of circle diagram

Ans: a

61. In a three-phase induction motor

- (a) iron losses in stator will be negligible as compared to that in rotor
- (b) iron losses in motor will be negligible as compared to that in rotor
- (c) iron losses in stator will be less than that in rotor
- (d) iron losses in stator will be more than that in rotor

Ans: d

62. In case of 3-phase induction motors, plugging means

- (a) pulling the motor directly on line without a starter
- (b) locking of rotor due to harmonics
- (c) starting the motor on load which is more than the rated load
- (d) interchanging two supply phases for quick stopping

Ans: d

63. Which is of the following data is required to draw the circle diagram for an induction motor ?

- (a) Block rotor test only
- (b) No load test only
- (c) Block rotor test and no-load test
- (d) Block rotor test, no-load test and stator resistance test

Ans: d

64. In three-phase induction motors sometimes copper bars are placed deep in the rotor to

- (a) improve starting torque
- (b) reduce copper losses
- (c) improve efficiency
- (d) improve power factor

Ans: a

65. In a three-phase induction motor

- (a) power factor at starting is high as compared to that while running
- (b) power factor at starting is low as compared to that while running
- (c) power factor at starting is the same as that while running

Ans: b

66. The value of transformation ratio of an induction motor can be found by

- (a) open-circuit test only
- (b) short-circuit test only
- (c) stator resistance test
- (d) none of the above

Ans: b

67. The power scale of circle diagram of an induction motor can be found from

- (a) stator resistance test
- (b) no-load test only
- (c) short-circuit test only
- (d) none of the above

Ans: c

68. The shape of the torque/slip curve of induction motor is

- (a) parabola
- (b) hyperbola
- (c) rectangular parabola
- (d) straight line

Ans: c

69. A change of 4% of supply voltage to an induction motor will produce a change of approximately

- (a) 4% in the rotor torque
- (b) 8% in the rotor torque
- (c) 12% in the rotor torque
- (d) 16% in the rotor torque

Ans: d

70. The starting torque of the slip ring induction motor can be increased by adding

- (a) external inductance to the rotor
- (b) external resistance to the rotor
- (c) external capacitance to the rotor
- (d) both resistance and inductance to rotor

Ans: b

71. A 500 kW, 3-phase, 440 volts, 50 Hz, A.C. induction motor has a speed of 960 r.p.m. full load. The machine has 6 poles. The slip of the machine will be

- (a) 0.01
- (b) 0.02
- (c) 0.03
- (d) 0.04

Ans: d

72. The complete circle diagram of induction motor can be drawn with the help of data found from

- (a) no-load test
- (b) blocked rotor test
- (c) stator resistance test
- (d) all of the above

Ans: d

73. In the squirrel-cage induction motor the rotor slots are usually given slight skew

- (a) to reduce the magnetic hum and locking tendency of the rotor
- (b) to increase the tensile strength of the rotor bars
- (c) to ensure easy fabrication
- (d) none of the above

Ans: a

74. The torque of a rotor in an induction motor under running condition is maximum

- (a) at the unit value of slip
- (b) at the zero value of slip
- (c) at the value of the slip which makes rotor reactance per phase equal to the resistance per phase
- (d) at the value of the slip which makes the rotor reactance half of the rotor

Ans: c

75. What will happen if the relative speed between the rotating flux of stator and rotor of the induction motor is zero ?

- (a) The slip of the motor will be 5%

- (b) The rotor will not run
- (c) The rotor will run at very high speed
- (d) The torque produced will be very large

Ans: b

76. The circle diagram for an induction motor cannot be used to determine

- (a) efficiency
- (b) power factor
- (c) frequency
- (d) output

Ans: a

77. Blocked rotor test on induction motors is used to find out

- (a) leakage reactance
- (b) power factor on short circuit
- (c) short-circuit current under rated voltage
- (d) all of the above

Ans: d

78. Lubricant used for ball bearing is usually

- (a) graphite
- (b) grease
- (c) mineral oil
- (d) molasses

Ans: b

79. An induction motor can run at synchronous speed when

- (a) it is run on load
- (b) it is run in reverse direction
- (c) it is run on voltage higher than the rated voltage
- (d) e.m.f. is injected in the rotor circuit

Ans: d

80. Which motor is preferred for use in mines where explosive gases exist ?

- (a) Air motor

- (b) Induction motor

- (c) D.C. shunt motor
- (d) Synchronous motor

Ans: a

81. The torque developed by a 3-phase induction motor least depends on

- (a) rotor current
- (b) rotor power factor
- (c) rotor e.m.f.
- (d) shaft diameter

Ans: d

82. In an induction motor if air-gap is increased

- (a) the power factor will be low
- (b) windage losses will be more
- (c) bearing friction will reduce
- (d) copper loss will reduce

Ans: a

83. In induction motor, percentage slip depends on

- (a) supply frequency
- (b) supply voltage
- (c) copper losses in motor
- (d) none of the above

Ans: c

84. When R_2 is the rotor resistance, X_2 the rotor reactance at supply frequency

and s the slip, then the condition for maximum torque under running conditions will be

- (a) $sR_2X_2 = 1$
- (b) $sR_2 = X_2$
- (c) $R_2 = sX_2$
- (d) $R_2 = s^2X_2$

Ans: c

85. In case of a double cage induction motor, the inner cage has

- (a) high inductance and low resistance
- (b) low inductance and high resistance
- (c) low inductance and low resistance
- (d) high inductance and high resistance

Ans: a

86. The low power factor of induction motor is due to

- (a) rotor leakage reactance
- (b) stator reactance
- (c) the reactive lagging magnetizing current necessary to generate the magnetic flux
- (d) all of the above

Ans: d

87. Insertion of reactance in the rotor circuit

- (a) reduces starting torque as well as maximum torque
- (b) increases starting torque as well as maximum torque
- (c) increases starting torque but maximum torque remains unchanged
- (d) increases starting torque but maximum torque decreases

Ans: a

88. Insertion of resistance in the rotor of an induction motor to develop a given torque

- (a) decreases the rotor current
- (b) increases the rotor current
- (c) rotor current becomes zero
- (d) rotor current remains same

Ans: d

89. For driving high inertia loads best type of induction motor suggested is

- (a) slip ring type
- (b) squirrel cage type
- (c) any of the above
- (d) none of the above

Ans: a

90. Temperature of the stator winding of a three phase induction motor is obtained by

- (a) resistance rise method
- (b) thermometer method
- (c) embedded temperature method
- (d) all above methods

Ans: d

91. The purpose of using short-circuit gear is
- (a) to short circuit the rotor at slip rings
 - (b) to short circuit the starting resistances in the starter
 - (c) to short circuit the stator phase of motor to form star
 - (d) none of the above

Ans: a

92. In a squirrel cage motor the induced e.m.f. is
- (a) dependent on the shaft loading
 - (b) dependent on the number of slots
 - (c) slip times the stand still e.m.f. induced in the rotor
 - (d) none of the above

Ans: c

93. Less maintenance troubles are experienced in case of
- (a) slip ring induction motor
 - (b) squirrel cage induction motor
 - (c) both (a) and (b)
 - (d) none of the above

Ans: b

94. A squirrel cage induction motor is not selected when
- (a) initial cost is the main consideration
 - (b) maintenance cost is to be kept low
 - (c) higher starting torque is the main consideration
 - (d) all above considerations are involved

Ans: c

95. Reduced voltage starter can be used with
- (a) slip ring motor only but not with squirrel cage induction motor
 - (b) squirrel cage induction motor only but not with slip ring motor
 - (c) squirrel cage as well as slip ring induction motor
 - (d) none of the above

Ans: c

96. Slip ring motor is preferred over squirrel cage induction motor where
- (a) high starting torque is required
 - (b) load torque is heavy
 - (c) heavy pull out torque is required
 - (d) all of the above

Ans: a

97. In a star-delta starter of an induction motor
- (a) resistance is inserted in the stator
 - (b) reduced voltage is applied to the stator
 - (c) resistance is inserted in the rotor
 - (d) applied voltage per 1 stator phase is 57.7% of the line voltage

Ans: d

98. The torque of an induction motor is
- (a) directly proportional to slip
 - (b) inversely proportional to slip
 - (c) proportional to the square of the slip

(d) none of the above

Ans: a

99. The rotor of an induction motor runs at
- (a) synchronous speed
 - (b) below synchronous speed
 - (c) above synchronous speed
 - (d) any of the above

Ans: b

100. The starting torque of a three phase induction motor can be increased by
- (a) increasing slip
 - (b) increasing current
 - (c) both (a) and (b)
 - (d) none of the above

Ans: c

101. Insertion of resistance in the stator of an induction motor

- (a) increases the load torque
- (b) decreases the starting torque
- (c) increases the starting torque
- (d) none of the above

Ans: b

5. SINGLE PHASE INDUCTION MOTORS

1. In a split phase motor, the running winding should have

- (a) high resistance and low inductance
- (b) low resistance and high inductance
- (c) high resistance as well as high inductance
- (d) low resistance as well as low inductance

Ans: b

2. If the capacitor of a single-phase motor is short-circuited

- (a) the motor will not start
- (b) the motor will run
- (c) the motor will run in reverse direction
- (d) the motor will run in the same direction at reduced r.p.m.

Ans: a

3. In capacitor start single-phase motors

- (a) current in the starting winding leads the voltage
- (b) current in the starting winding lags the voltage
- (c) current in the starting winding is in phase with voltage in running winding
- (d) none of the above

Ans: a

4. In a capacitor start and run motors the function of the running capacitor in series with the auxiliary winding is to

- (a) improve power factor
- (b) increase overload capacity
- (c) reduce fluctuations in torque
- (d) to improve torque

Ans: a

5. In a capacitor start motor, the phase displacement between starting and running winding can be nearly

- (a) 10°
- (b) 30°
- (c) 60°
- (d) 90°

Ans: d

6. In a split phase motor

- (a) the starting winding is connected through a centrifugal switch
- (b) the running winding is connected through a centrifugal switch
- (c) both starting and running windings are connected through a centrifugal switch
- (d) centrifugal switch is used to control supply voltage

Ans: a

7. The rotor developed by a single-phase motor at starting is

- (a) more than i.he rated torque
- (b) rated torque
- (c) less than the rated torque
- (d) zero

Ans: d

8. Which of the following motor will give relatively high starting torque ?

- (a) Capacitor start motor
- (b) Capacitor run motor
- (c) Split phase motor
- (d) Shaded pole motor

Ans: a

9. Which of the following motor will have relatively higher power factor ?

- (a) Capacitor run motor
- (b) Shaded pole motor
- (c) Capacitor start motor
- (d) Split phase motor

Ans: a

10. In a shaded pole motor, the shading coil usually consist of
- (a) a single turn of heavy wire which is in parallel with running winding
 - (b) a single turn of heavy copper wire which is short-circuited and carries only induced current
 - (c) a multilayer fine gauge copper wire in parallel with running winding
 - (d) none of the above

Ans: b

11. In a shaded pole single-phase motor, the revolving field is produced by the use of
- (a) inductor
 - (b) capacitor
 - (c) resistor
 - (d) shading coils

Ans: d

12. A centrifugal switch is used to dis- connect 'starting winding when motor has
- (a) run for about 1 minute
 - (b) run for about 5 minutes
 - (c) picked up about 50 to 70 per cent of rated speed
 - (d) picked up about 10 to 25 per cent of rated speed

Ans: c

13. If a particular application needs high speed and high starting torque, then which of the following motor will be preferred ?

- (a) Universal motor
- (b) Shaded pole type motor
- (c) Capacitor start motor
- (d) Capacitor start and run motor

Ans: a

14. The value of starting capacitor of a fractional horse power motor will be
- (a) 100 μ F
 - (b) 200 μ F
 - (c) 300 μ F
 - (d) 400 μ F

Ans: c

15. In repulsion motor direction of rotation of motor

- (a) is opposite to that of brush shift
- (b) is the same as that of brush shift
- (c) is independent of brush shift

Ans: b

16. In a single phase motor the centrifugal switch

- (a) disconnects auxiliary winding of the motor
- (b) disconnects main winding of the motor
- (c) reconnects the main winding the motor
- (d) reconnects the auxiliary winding of the motor

Ans: a

17. The running winding of a single phase motor on testing with meggar is found to be ground. Most probable location of the ground will be

- (a) at the end connections
- (b) at the end terminals
- (c) anywhere on the winding inside a slot
- (d) at the slot edge where coil enters or comes out of the slot

Ans: d

18. A capacitor-start single phase induction motor is switched on to supply with its capacitor replaced by an inductor of equivalent reactance value. It will

- (a) start and then stop
- (b) start and run slowly
- (c) start and run at rated speed
- (d) not start at all

Ans: d

19. Which of the following motors is used in mixies ?

- (a) Repulsion motor
- (b) Reluctance motor
- (c) Hysteresis motor
- (d) Universal motor

Ans: d

20. Which of the following motors is inherently self starting ?

- (a) Split motor
- (b) Shaded-pole motor
- (c) Reluctance motor
- (d) None of these

Ans: b

21. The direction of rotation of an hysteresis motor is determined by

- (a) interchanging the supply leads
- (b) position of shaded pole with respect to main pole
- (c) retentivity of the rotor material
- (d) none of these

Ans: b

22. Burning out of windings is due to

- (a) short circuited capacitor
- (b) capacitor value having changed
- (c) open circuiting of capacitor
- (d) none of the above

Ans: a

23. Direction of rotation of a split phase motor can be reversed by reversing the connection of

- (a) running winding only
- (b) starting winding only
- (c) either (a) or (b)
- (d) both (a) and (b)

Ans: c

24. Short-circuiter is used in

- (a) repulsion induction motor
- (b) repulsion motor
- (c) repulsion start induction run motor
- (d) none of the above

Ans: c

25. The range of efficiency for shaded pole motors is

- (a) 95% to 99%
- (b) 80% to 90%
- (c) 50% to 75%
- (d) 5% to 35%

Ans: d

26. In a capacitor start single-phase motor, when capacitor is replaced by a resistance

- (a) torque will increase
- (b) the motor will consume less power
- (c) motor will run in reverse direction
- (d) motor will continue to run in same direction

Ans: d

27. The power factor of a single-phase induction motor is usually

- (a) lagging
- (b) always leading
- (c) unity
- (d) unity to 0.8 leading

Ans: a

28. A shaded pole motor can be used for

- (a) toys
- (b) hair dryers
- (c) circulators
- (d) any of the above

Ans: d

29. A hysteresis motor works on the principle of

- (a) hysteresis loss
- (b) magnetisation of rotor
- (c) eddy current loss
- (d) electromagnetic induction

Ans: a

30. Which of the following motor will give the highest starting torque ?

- (a) D.C. shunt motor

- (b) Schrage motor
- (c) Repulsion start and induction run motor
- (d) Universal motor

Ans: b

31. For which of the applications a reluctance motor is preferred ?

- (a) Electric shavers
- (b) Refrigerators
- (c) Signalling and timing devices
- (d) Lifts and hoists

Ans: c

32. The motor used on small lathes is usually

- (a) universal motor
- (b) D.C. shunt motor
- (c) single-phase capacitor run motor
- (d) 3-phase synchronous motor

Ans: c

33. Which of the following motors is preferred for tape-recorders ?

- (a) Shaded pole motor
- (b) Hysteresis motor
- (c) Two value capacitor motor
- (d) Universal motor

Ans: b

34. 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

35. A schrage motor can run on

- (a) zero slip
- (b) negative slip
- (c) positive slip

(d) all of the above

Ans: d

36. A universal motor can run on

(a) A.C. only

(b) D.C. only

(c) either A.C. or D.C.

(d) none of the above

Ans: c

37. Which of the following single-phase motors is suitable for timing and control purposes ?

(a) Reluctance motor

(b) Series motor

(c) Repulsion motor

(d) Universal motor

Ans: a

38. Single phase induction motor usually operates on

(a) 0.6 power factor lagging

(b) 0.8 power factor lagging

(c) 0.8 power factor leading

(d) unity power factor

Ans: a

39. In split-phase motor auxiliary winding is of

(a) thick wire placed at the bottom of the slots

(b) thick wire placed at the top of the slots

(c) thin wire placed at the top of the slots

(d) thin wire placed at the bottom of the slots

Ans: c

40. Which of the following motors will operate at high power factor ?

(a) Shaped pole motor

(b) Split phase motor

(c) Capacitor start motor

(d) Capacitor run motor

Ans: d

41. In a two value capacitor motor, the capacitor used for running purposes is

- (a) air capacitor
- (b) paper spaced oilfilled type
- (c) ceramic type
- (d) a.c. electrolytic type

Ans: b

42. Which of the following motors can be run on AC. as well as D.C. supply ?

- (a) Universal motor
- (b) Repulsion motor
- (c) Synchronous motor
- (d) Reluctance motor

Ans: a

43. In A.C. series motor compensating winding is employed to

- (a) reduce the effects of armature reaction
- (b) increase the torque
- (c) reduce sparking at the brushes
- (d) none of the above

Ans: c

44. Which of the following single-phase induction motors is generally used in time phonographs ?

- (a) Resistance start
- (b) Capacitor start capacitor run
- (c) Shaded pole
- (d) Universal

Ans: c

45. Which of the following motors has highest starting torque ?

- (a) Repulsion motor
- (b) Shaped pole motor
- (c) Capacitor-start motor
- (d) Split-phase motor

Ans: c

46. The repulsion-start induction-run motor is used because of

- (a) good power factor
- (b) high efficiency
- (c) minimum cost
- (d) high starting torque

Ans: d

47. In case of a shaded pole motor the direction of rotation of the motor is

- (a) from main pole to shaded pole
- (b) from shaded pole to main pole
- (c) either of the above depending on voltage
- (d) either of the above depending on power factor

Ans: a

48. In case of high speed universal motor which of the following needs more attention ?

- (a) End play
- (b) Air gap
- (c) Insulation in rotor
- (d) Balancing of rotor

Ans: d

49. The wattage rating for a ceiling fan motor will be in the range

- (a) 200 to 250 W
- (b) 250 to 500 W
- (c) 50 to 150 W
- (d) 10 to 20 W

Ans: c

50. The wattage of motor for driving domestic sewing machine will be around

- (a) 100 to 150 W
- (b) 40 to 75 W
- (c) 10 to 30 W
- (d) 5 to 10 W

Ans: a

51. Which of the following single-phase motors has relatively poor starting torque ?

- (a) Universal motor
- (b) Repulsion motor
- (c) Capacitor motor
- (d) All single phase motors have zero starting torque

Ans: c

52. Which type of load is offered by cranes and hoists ?

- (a) Gradually varying load
- (b) Non-reversing, no-load start
- (c) Reversing, light start
- (d) Reversing, heavy start

Ans: d

53. The speed of a universal motor is generally reduced by using

- (a) gear trains
- (b) V-belts
- (c) brakes
- (d) chains

Ans: a

54. Which of the following motors can be used for unity power factor ?

- (a) Capacitor run motor
- (b) Shaded pole motor
- (c) Hysteresis motor
- (d) Schrage motor

Ans: d

55. When a D.C. series motor is connected to A.C. supply, the power factor will be low because of

- (a) high inductance of field and armature circuits
- (b) induced current in rotor due to variations of flux
- (c) fine copper wire winding
- (d) none of the above

Ans: a

56. The direction of rotation of universal motor can be reversed the by reversing the flow

of current through

- (a) armature winding
- (b) field winding
- (c) either armature winding or field winding
- (d) none of the above

Ans: c

57. In which single-phase motor, the rotor has no teeth or winding ?

- (a) Split phase motor
- (b) Reluctance motor
- (c) Hysteresis motor
- (d) Universal motor

Ans: c

58. Which motor is normally free from mechanical and magnetic vibrations ?

- (a) Split phase motor
- (b) Universal motor
- (c) Hysteresis motor
- (d) Shaded pole motor

Ans: c

59. As hysteresis motors are free from mechanical and magnetic vibrations therefore these are considered as suitable for

- (a) fans
- (b) blowers
- (c) sound equipment
- (d) mixer grinders

Ans: c

60. A reluctance motor

- (a) is self-starting
- (b) is constant speed motor
- (c) needs no D.C. excitation
- (d) all of the above

Ans: d

61. In a hysteresis motor, the rotor must have

- (a) retentivity
- (b) resistivity
- (c) susceptibility
- (d) none of the above

Ans: a

62. The rotor of a hysteresis motor is made of

- (a) aluminium
- (b) cast iron
- (c) chrome steel
- (d) copper

Ans: c

63. The electric motor used in portable drills is

- (a) capacitor run motor
- (b) hysteresis motor
- (c) universal motor
- (d) repulsion motor

Ans: c

64. Which of the following applications always have some load whenever switched on ?

- (a) Vacuum cleaners
- (b) Fan motors
- (c) Pistol drills
- (d) All of the above

Ans: c

65. The speed control of universal motor used for sewing machines is by

- (a) friction
- (b) varying the resistance
- (c) tapping the field
- (d) centrifugal mechanism

Ans: b

66. Torque developed by a single phase induction motor at starting is

- (a) pulsating
- (b) uniform

- (c) none of the above
- (d) nil

Ans: d

67. In split phase motor main winding is of
- (a) thin wire placed at the top of the slots
 - (b) thin wire placed at the bottom of the slots
 - (c) thick wire placed at the bottom of the slots
 - (d) thick wire placed at the top of the " slots

Ans: c

68. In repulsion motor, maximum torque is developed when
- (a) brush axis is at 45° electrical to the field axis
 - (b) brush axis coincides with the field axis
 - (c) brush axis is at 90° electrical to the field axis
 - (d) none of the above

Ans: a

69. If the centrifugal switch does not open at 70 to 80 percent of synchronous speed of motor, it would result in
- (a) damage to the starting winding
 - (b) damage to the centrifugal switch
 - (c) overloading of running winding
 - (d) none of the above

Ans: a

70. Speed torque characteristic of a repulsion induction motor is similar to that of a D.C.
- (a) shunt motor
 - (b) series motor
 - (c) compound motor
 - (d) separately excited motor

Ans: c

71. In a ceilingfan employing capacitor run motor
- (a) secondary winding surrounds the primary winding
 - (b) primary winding surrounds the secondary winding

- (c) both are usual arrangements
- (d) none of the above

Ans: a

72. The shaded pole motor is used for

- (a) high starting torque
- (b) low starting torque
- (c) medium starting torque
- (d) very high starting torque

Ans: b

73. The rotor slots, in an induction motor, are usually not quite parallel to the shaft because it

- (a) improves the efficiency
- (b) helps the rotor teeth to remain under the stator teeth
- (c) helps in reducing the tendency of the rotor teeth to remain under the stator teeth
- (d) improves the power factor

Ans: c

74. The speed/load characteristics of a universal motor is same as that of

- (a) A.C. motor
- (b) D.C. shunt motor
- (c) D.C. series motor
- (d) none of the above

Ans: c

75. The purpose of stator winding in the compensated repulsion motor is to

- (a) provide mechanical balance
- (b) improve power factor and provide better speed regulation
- (c) prevent hunting in the motor
- (d) eliminate armature reaction

Ans: b

76. Which of the following motors is used for unity power factor ?

- (a) Hysteresis motor
- (b) Schrage motor
- (c) Universal motor

(d) Reluctance motor

Ans: b

77. The motor used for the compressors is

(a) d.c. series motor

(b) shaded pole motor

(c) capacitor-start capacitor-run motor

(d) reluctance motor

Ans: c

78. Which of the following motors is used in a situation where load increases with speed ?

(a) Induction motor

(b) Three-phase series motor

(c) Schrage motor

(d) Hysteresis motor

Ans: b

79. In repulsion motor, zero torque is developed when

(a) brush axis is 45° electrical to field axis

(b) brush axis coincides with the field axis

(c) brush axis is 90° electrical to field axis

(d) both (b) and (c)

Ans: d

80. Centrifugal switch disconnects the auxiliary winding of the motor at about percent of synchronous speed

(a) 30 to 40

(b) 70 to 80

(c) 80 to 90

(d) 100

Ans: b

81. Starting winding of a single phase motor of a refrigerator is disconnected from the circuit by means of a

(a) magnetic relay

(b) thermal relay

(c) centrifugal switch

(d) none of the above

Ans: a

82. If a single phase induction motor runs slower than normal, the most likely defect is

- (a) worn bearings
- (b) short-circuit in the winding
- (c) open-circuit in the winding
- (d) none of the above

Ans: a

83. Which of the following motors is used in tape-recorders ?

- (a) Hysteresis motor
- (b) Reluctance motor
- (c) Capacitor-run motor
- (d) Universal motor

Ans: a

84. Which of the following statements regarding two value capacitor motor is incorrect ?

- (a) It is a reversing motor
- (b) It is preferred to permanent-split single-value capacitor motor where frequent reversals are required
- (c) It has low starting as well as running currents
- (d) It has high starting torque

Ans: b

85. Two-value capacitor motor finds increased application as compressor motor in small home air-conditioners

because

- (a) it is comparatively cheaper
- (b) it has almost non-destructible capacitor
- (c) it has low starting as well as running currents at relatively high power factor
- (d) it is quiet in operation

Ans: c

86. If the centrifugal switch of a two-value capacitor motor using two capacitors fails to open then

- (a) motor will not come upto speed

(b) motor will not carry the load

(c) current drawn by the motor will be excessively high

(d) electrolytic capacitor will, in all probability, suffer break down

Ans: d

87. In a universal motor, the most common cause of brush sparking is

(a) open armature winding

(b) shorted armature winding

(c) shorted field winding"

(d) high commutator mica

(e) all of the above

Ans: e

88. If starting winding of a single-phase induction motor is left in the circuit, it will

(a) run faster

(b) spark at light loads

(c) draw excessive current and overheat

(d) run slower

Ans: c

89. Most of the fractional horsepower motors have either

(a) hard and annealed bearings

(b) ball or roller bearings

(c) soft and porous bearings

(d) plain or sleeve bearings

Ans: d

90. Which of the following statements regarding reluctance-start motor is incorrect ?

(a) It is similar to reluctance motor

(b) It is basically an induction motor and not a synchronous one

(c) So far as its basic working principle is concerned, it is similar to shaded pole motor

(d) the air-gap between rotor and salient poles is non- uniform

Ans: a

91. To reverse the direction of rotation of a capacitor start motor while it is running we should

- (a) disconnect motor from the supply till it stops then reconnect it to supply with reversed connection of main or auxiliary winding
- (b) disconnect motor from supply and immediately reconnect it to supply with reversed connections of the main winding
- (c) reverse the direction of connection of the auxiliary winding and after motor comes to rest then connect auxiliary winding to the supply
- (d) reverse the direction of connections of the auxiliary winding and immediately connect it to supply

Ans: a

92. In case of a reluctance motor, when the load is increased so that it cannot maintain synchronous speed the motor will

- (a) become unstable
- (b) draw excessive armature current and may burn out
- (c) fall out of synchronism and come to stand still
- (d) run as induction motor

Ans: d

93. Which of the following motors has two separate windings on the motor ?

- (a) Repulsion motor
- (b) Repulsion induction motor
- (c) Repulsion start induction run motor
- (d) None of the above

Ans: b

94. A shaded pole motor does not possess

- (a) centrifugal switch
- (b) capacitor
- (c) commutator
- (d) all of the above

Ans: d

95. In a A.C. series motor armature coils are usually connected to commutator

- (a) through resistance
- (b) through reactances
- (c) through capacitors

(d) solidly

Ans: a

96. Which of the following statements regarding a reluctance motor is incorrect ?

(a) It cannot be reversed, ordinarily

(b) It requires no D.C. field excitation for its operation

(c) It is nothing else but a single-phase, salient pole synchronous-induction motor

(d) Its squirrel cage-rotor is of unsym-metrical magnetic construction in order to vary reluctance path between stator and rotor

Ans: a

97. A universal motor is one which

(a) can be operated either on D.C. or A.C. supply at approximately the same speed and output

(b) can be marketed internationally

(c) runs at dangerously high speed on no-load

Ans: a

98. A repulsion motor is equipped with

(a) slip rings

(b) commutator

(c) both (a) and (b)

(d) none of the above

Ans: b

99. The capacitors used in single-phase capacitor motors have no

(a) voltage rating

(b) dielectric medium

(c) polarity marking

(d) definite value

Ans: c

100. If a D.C. series motor is operated on A.C. supply, it will

(a) spark excessively

(b) have poor efficiency

(c) have poor power factor

(d) all of the above

Ans: d

101. After the starting winding of a single phase induction motor is disconnected from supply, it continues to run only on

(a) running winding

(b) rotor winding

(c) field winding

(d) compensating winding

Ans: a

102. Which of the following statements regarding repulsion-start induction motor is incorrect ?

(a) It requires more maintenance of commutator and other mechanical devices

(b) It makes quite a bit of noise on starting

(c) In fractional horse power motors, it has replaced the capacitor motors

(d) It is not easily reversed

Ans: c

103. A.C. series motor as compared to D.C. series motor has

(a) smaller brush width

(b) less number of field turns

(c) more number of armature turns

(d) less air gap

(e) all of the above

Ans: e

104. Locked rotor current of a shaded pole motor is

(a) equal to full load current

(b) less than full load current

(c) slightly more than full load current

(d) several times the full load current

Ans: c

105. Speed control of a universal motor is achieved by

(a) varying field flux with tapped field windings

(b) connecting rheostat in series

- (c) applying variable voltage by means of silicon controlled rectifier
- (d) applying variable voltage by means of variable auto-transformer
- (e) all of the above methods

Ans: e

106. Hysteresis motor is particularly useful for high-quality record players and tape-recorders because

- (a) it revolves synchronously
- (b) it is not subject to any magnetic or mechanical vibrations
- (c) it can be easily manufactured in extremely small sizes of upto 1 W output
- (d) it develops hysteresis torque which is extremely steady both in amplitude and phase

Ans: d

107. Which of the following statements regarding hysteresis motor is incorrect ?

- (a) It is extremely sensitive to fluctuations in supply voltage
- (b) Its high starting torque is due to its high rotor hysteresis loss
- (c) It is extremely quiet in operation
- (d) It accelerates from rest to full-speed almost instantaneously

Ans: a

108. Which of the following statements regarding single-phase induction motor is correct ?

- (a) It requires only one winding
- (b) It can rotate in one direction only
- (c) It is self-starting
- (d) It is not self-starting

Ans: d

109. The starting winding of a single-phase motor is placed in

- (a) armature
- (b) field
- (c) rotor
- (d) stator

Ans: d

110. The speed of a universal motor is usually reduced by using

- (a) gearing

- (b) belts
- (c) brakes
- (d) chains

Ans: a

6. SYNCHRONOUS MOTORS

1. Synchronous motors are generally not self-starting because

- (a) the direction of rotation is not fixed
- (b) the direction of instantaneous torque reverses after half cycle
- (c) starters cannot be used on these machines
- (d) starting winding is not provided on the machines

Ans: b

2. In case one phase of a three-phase synchronous motor is short-circuited the motor will

- (a) not start
- (b) run at $2/3$ of synchronous speed
- (c) run with excessive vibrations
- (d) take less than the rated load

Ans: a

3. A pony motor is basically a

- (a) small induction motor
- (b) D.C. series motor
- (c) D.C. shunt motor
- (d) double winding A.C./D.C. motor

Ans: a

4. A synchronous motor can develop synchronous torque

- (a) when under loaded
- (b) while over-excited
- (c) only at synchronous speed
- (d) below or above synchronous speed

Ans: c

5. A synchronous motor can be started by

- (a) pony motor
- (b) D.C. compound motor
- (c) providing damper winding
- (d) any of the above

Ans: d

6. A three-phase synchronous motor will have

- (a) no slip-rings
- (b) one slip-ring
- (c) two slip-rings
- (d) three slip-rings

Ans: c

7. Under which of the following conditions hunting of synchronous motor is likely to occur ?

- (a) Periodic variation of load
- (b) Over-excitation
- (c) Over-loading for long periods
- (d) Small and constant load

Ans: a

8. When the excitation of an unloaded salient pole synchronous motor suddenly gets disconnected

- (a) the motor stops
- (b) it runs as a reluctance motor at the same speed
- (c) it runs as a reluctance motor at a lower speed
- (d) none of the above

Ans: a

9. When V is the applied voltage, then the breakdown torque of a synchronous motor varies as

- (a) V
- (b) V^3
- (c) V^2
- (d) $1/V$

Ans: c

10. The power developed by a synchronous motor will be maximum when the load angle

is

(a) zero

(b) 45°

(c) 90°

(d) 120°

Ans: c

11. A synchronous motor can be used as a synchronous capacitor when it is

(a) under-loaded

(b) over-loaded

(c) under-excited

(d) over-excited

Ans: d

12. A synchronous motor is running on a load with normal excitation. Now if the load on the motor is increased

(a) power factor as well as armature current will decrease

(b) power factor as well as armature current will increase

(c) power factor will increase but armature current will decrease

(d) power factor will decrease and armature current will increase

Ans: d

13. Mostly, synchronous motors are of

(a) alternator type machines

(b) induction type machines

(c) salient pole type machines

(d) smooth cylindrical type machines

Ans: c

14. The synchronous motor is not inherently self-starting because

(a) the force required to accelerate the rotor to the synchronous speed in an instant is absent

(b) the starting device to accelerate the rotor to near synchronous speed is absent

(c) a rotating magnetic field does not have enough poles

(d) the rotating magnetic field is produced by only 50 Hz frequency currents

Ans: a

15. As the load is applied to a synchronous motor, the motor takes more armature current because

- (a) the increased load has to take more current
- (b) the rotor by shifting its phase backward causes motor to take more current
- (c) the back e.m.f. decreases causing an increase in motor current
- (d) the rotor strengthens the rotating field causing more motor current

Ans: b

16. Synchronous motor always runs at

- (a) the synchronous speed
- (b) less than synchronous speed
- (c) more than synchronous speed
- (d) none of the above

Ans: a

17. An over-excited synchronous motor takes

- (a) leading current
- (b) lagging current
- (c) both (a) and (b)
- (d) none of the above

Ans: a

18. The working of a synchronous motor is similar to

- (a) gear train arrangement
- (b) transmission of mechanical power by shaft
- (c) distribution transformer
- (d) turbine
- (e) none of the above

Ans: b

19. The minimum armature current of the synchronous motor corresponds to operation at

- (a) zero power factor leading
- (b) unity power factor
- (c) 0.707 power factor lagging
- (d) 0.707 power factor leading

Ans: b

20. In a synchronous motor, the magnitude of stator back e.m.f. E_b depends on

- (a) d.c. excitation only
- (b) speed of the motor
- (c) load on the motor
- (d) both the speed and rotor flux

Ans: a

21. If load (or torque) angle of a 4-pole synchronous motor is 6° electrical, its value in mechanical degrees is

- (a) 2
- (b) 3
- (c) 4
- (d) 6

Ans: b

22. For V-curves for a synchronous motor the graph is drawn between

- (a) field current and armature current
- (b) terminal voltage and load factor
- (c) power factor and field current
- (d) armature current and power factor

Ans: a

23. The back e.m.f. of a synchronous motor depends on

- (a) speed
- (b) load
- (c) load angle
- (d) all of the above

Ans: c

24. A synchronous motor can operate at

- (a) lagging power factor only
- (b) leading power factor only
- (c) unity power factor only
- (d) lagging, leading and unity power factors

Ans: d

25. In a synchronous motor which loss varies with load ?

- (a) Windage loss
- (b) Bearing friction loss
- (c) Copper loss
- (d) Core loss

Ans: c

26. A synchronous motor can be made self starting by providing

- (a) damper winding on rotor poles
- (b) damper winding on stator
- (c) damper winding on stator as well as rotor poles
- (d) none of the above

Ans: d

27. The oscillations in a synchronous motor can be damped out by

- (a) maintaining constant excitation
- (b) running the motor on leading power factors
- (c) providing damper bars in the rotor pole faces
- (d) oscillations cannot be damped

Ans: c

28. The shaft of synchronous motor is made of

- (a) mild steel
- (b) chrome steel
- (c) alnico
- (d) stainless steel

Ans: a

29. When the field of a synchronous motor is under-excited, the power factor will be

- (a) leading
- (b) lagging
- (c) unity
- (d) zero

Ans: b

30. The speed regulation of a synchronous motor is always

- (a) 1%

- (b) 0.5%
- (c) positive
- (d) zero

Ans: d

31. The percentage slip in case of a synchronous motor is

- (a) 1%
- (b) 100%
- (c) 0.5%
- (d) zero

Ans: d

32. The operating speed of a synchronous motor can be changed to new fixed value by

- (a) changing the load
- (b) changing the supply voltage
- (c) changing frequency
- (d) using brakes

Ans: c

33. A synchronous motor will always stop when

- (a) supply voltage fluctuates
- (b) load in motor varies
- (c) excitation winding gets disconnected
- (d) supply voltage frequency changes

Ans: c

34. hunting in a synchronous motor takes place

- (a) when supply voltage fluctuates
- (b) when load varies
- (c) when power factor is unity
- (d) motor is under loaded

Ans: b

35. When load on an over-excited or under excited synchronous* motor is increased, rate of change of its armature current as compared with that of power factor is

- (a) more

- (b) less
- (c) equal
- (d) twice

Ans: b

36. The rotor copper losses, in a synchronous motor, are met by

- (a) d.c. source
- (b) armature input
- (c) motor input
- (d) supply lines

Ans: a

37. The maximum power developed in a synchronous motor occurs at a coupling angle of

- (a) 30°
- (b) 60°
- (c) 90°
- (d) 180°

Ans: c

38. When the stator windings are connected in such a fashion that the number of poles are made half, the speed of

the rotor of a synchronous motor

- (a) remains same as the original value
- (b) decreases to half the original value
- (c) tends to become zero
- (d) increases to two times the original value

Ans: d

39. In which of the following motors the stator and rotor magnetic field rotate at the same speed ?

- (a) Universal motor
- (b) Synchronous motor
- (c) Induction motor
- (d) Reluctance motor

Ans: b

40. Synchronizing power of a synchronous machine is
- (a) directly proportional to the synchronous reactance
 - (b) inversely proportional to the synchronous reactance
 - (c) equal to the synchronous reactance
 - (d) none of the above

Ans: b

41. Synchronous motors are
- (a) not-self starting
 - (b) self-starting
 - (c) essentially self-starting
 - (d) none of the above

Ans: a

42. The standard full-load power factor ratings for synchronous motors are
- (a) zero or 0.8 leading
 - (b) unity or 0.8 lagging
 - (c) unity or 0.8 leading
 - (d) unity or zero

Ans: c

43. A synchronous motor running with normal excitation adjusts to load increases essentially by increase in
- (a) back e.m.f.
 - (b) armature current
 - (c) power factor
 - (d) torque angle

Ans: b

44. A synchronous motor has better power factor as compared to that of an equivalent induction motor. This is mainly because
- (a) synchronous motor has no slip
 - (b) stator supply is not required to produce magnetic field
 - (c) mechanical load on the rotor remains constant
 - (d) synchronous motor has large airgap

Ans: b

45. A synchronous motor working at leading power factor can be used as

- (a) voltage booster
- (b) phase advancer
- (c) noise generator
- (d) mechanical synchronizer

Ans: b

46. Slip rings are usually made of

- (a) carbon or graphite
- (b) brass or steel
- (c) silver or gold
- (d) copper or aluminium

Ans: b

47. An over excited synchronous motor is used for

- (a) fluctuating loads
- (b) variable speed loads
- (c) low torque loads
- (d) power factor corrections

Ans: d

48. When the voltage applied to a synchronous motor is increased, which of the following will reduce ?

- (a) Stator flux
- (b) Pull in torque
- (c) Both (a) and (b)
- (d) None of the above

Ans: d

51. The efficiency of a properly designed synchronous motor will usually fall in range

- (a) 60 to 70%
- (b) 75 to 80%
- (c) 85 to 95%
- (d) 99 to 99.5%

Ans: c

52. To limit the operating temperature an electrical machine should have proper

- (a) voltage rating
- (b) current rating
- (c) power factor
- (d) speed

Ans: b

53. Slip-rings in a synchronous motor carry

- (a) direct current
- (b) alternating current
- (c) no current
- (d) all of the above

Ans: a

54. A synchronous machine with large air gap has

- (a) a higher value of stability limit
- (b) a small value of inherent regulation
- (c) a higher synchronizing power which makes the machine less sensitive to load variations
- (d) all of the above

Ans: d

55. The armature current of the synchronous motor has higher values for

- (a) high excitation only
- (b) low excitation only
- (c) both (a) and (b)
- (d) none of the above

Ans: c

56. In a synchronous motor running with fixed excitation, when the load is increased three times, its torque angle

becomes approximately

- (a) one-third
- (b) twice
- (c) thrice

- (d) six times
- (e) nine times

Ans: c

57. The angle between the rotating stator flux and rotor poles is called angle.

- (a) torque
- (b) obtuse
- (c) synchronizing
- (d) power factor

Ans: a

58. Which of the following methods is used to start a synchronous motor ?

- (a) Damper winding
- (b) Star-delta starter
- (c) Damper winding in conjunction with star-delta starter
- (d) Resistance starter in the armature circuit

Ans: c

59. When the rotor speed, in a synchronous machine, becomes more than the synchronous speed during hunting, the damper bars develop

- (a) inductor motor torque
- (b) induction generator torque
- (c) synchronous motor torque
- (d) d.c. motor torque
- (e) none of the above

Ans: b

60. An important advantage of a synchronous motor over wound round induction motor is that

- (a) its power factor may be varied at will
- (b) its speed is independent of supply frequency
- (c) its speed may be controlled more easily
- (d) none of the above

Ans: a

61. The mechanical displacement of the rotor with respect to the stator, in polyphase

multipolar synchronous motors
running at full load, is of the order of

- (a) zero degree
- (b) two degrees
- (c) five degrees
- (d) ten degrees

Ans: c

62. Power factor of a synchronous motor is unity when

- (a) the armature current is maximum
- (b) the armature current is minimum
- (c) the armature current is zero
- (d) none of the above

Ans: b

63. Change of D.C. excitation of a synchronous motor changes

- (a) applied voltage of the motor
- (b) motor speed
- (c) power factor of power drawn by the motor
- (d) any of the above
- (e) all of the above

Ans: c

64. While starting a synchronous motor by induction motor action, field winding is

usually

- (a) connected to D.C. supply
- (b) short-circuited by low resistance
- (c) kept open-circuited
- (d) none of the above

Ans: b

65. Which of the following motors will be used in electric clocks ?

- (a) D.C. shunt motor
- (b) D.C. series motor
- (c) A.C. induction motor
- (d) A.C. synchronous motor

Ans: d

66. If in a synchronous motor, driving mechanical load and drawing current at lagging power factor from constant voltage supply, its field excitation is increased, then its power factor

- (a) become more
- (b) become less
- (c) remain constant
- (d) none of the above

Ans: b

67. A synchronous motor installed at the receiving end substation operates with such an excitation that it takes power at lagging power factor. Now if the applied voltage of the synchronous motor goes down, the power factor of the synchronous motor will

- (a) remain same
- (b) go down
- (c) improve
- (d) none of the above

Ans: c

68. While starting a salient pole synchronous motor by induction motor action and connecting field discharge resistance across field, starting and accelerating torque is produced by

- (a) induction motor torque in field winding
- (b) induction motor torque in damper winding
- (c) eddy current and hysteresis torque in pole faces
- (d) reluctance motor torque due to saliency of the rotor
- (e) all of the above methods

Ans: e

69. Armature of a synchronous machine is

- (a) of reducing number of slip rings on the rotor
- (b) armature is associated with large power as compared to the field circuits
- (c) of difficulty of providing high voltage insulation on rotor
- (d) all of the above reasons

Ans: d

70. If excitation of a synchronous motor running with a constant load is decreased from its normal value, ignoring effects of armature reaction, it leads to

- (a) increase in both armature current and power factor angle
- (b) increase in back e.m.f. but decrease in armature current
- (c) increase in both armature current and power factor which is lagging
- (d) increase in torque angle but decrease in back e.m.f.

Ans: a

71. When a 3-phase synchronous generator is supplying a zero power factor lagging load the armature field affects

the main field in the following way

- (a) augments it directly
- (b) directly opposes it
- (c) cross-magnetises it
- (d) none of the above

Ans: b

72. Stability of a synchronous machine

- (a) decreases with increase in its excitation
- (b) increases with increase in its excitation
- (c) remains unaffected with increase in excitation
- (d) any of the above

Ans: b

73. The power factor of a synchronous motor is better than that of induction motor because

- (a) stator supply is relieved of responsibility of producing magnetic field
- (b) mechanical load on the motor can be adjusted
- (c) synchronous motor runs at synchronous speed
- (d) synchronous motor has large air gap

Ans: a

74. If in a synchronous motor, driving a given mechanical load and drawing current at a leading power factor from

constant voltage supply its field excitation is increased, its power factor

- (a) will become more
- (b) will become less
- (c) will remain unchanged
- (d) none of the above.

Ans: b

75. A synchronous motor is running with normal excitation. When the load is increased, the armature current drawn

by it increases because

- (a) speed of the motor is reduced
- (b) power factor is decreased
- (c) E_b (back e.m.f.) becomes less than V (applied voltage)
- (d) E_r (net resultant voltage) in armature is increased
- (e) none of the above

Ans: d

76. If one-phase of a 3-phase synchronous motor is short-circuited, motor

- (a) will refuse to start
- (b) will overheat in spots
- (c) will not come upto speed
- (d) will fail to pull into step

Ans: a

77. If the field circuit of an unloaded salientpole synchronous motor gets suddenly open-circuited, then

- (a) it runs at a slower speed
- (b) the motor stops
- (c) it continues to run at the same speed
- (d) it runs at a very high speed

Ans: b

78. In which of the following motors the stator and rotor fields rotate simultaneously ?

- (a) D.C. motor
- (b) Reluctance motor
- (c) Universal motor
- (d) Synchronous motor

(e) Induction motor

Ans: d

79. The speed of a synchronous motor

(a) increases as the load increases

(b) decreases as the load decreases

(c) always remains constant

(d) none of the above

Ans: c

80. A rotary converter can also be run as a

(a) d.c. shunt motor

(b) d.c. series motor

(c) d.c. compound motor

(d) induction motor

(e) synchronous motor

Ans: e

81. The maximum speed variation in a 3-phase synchronous motor is

(a) 10 per cent

(b) 6 per cent

(c) 4 per cent

(d) 2. per cent

(e) zero

Ans: e

82. Which of the following resistances can be measured by conducting insulation resistance test on a synchronous motor ?

(a) Phase to phase winding resistance

(b) Stator winding to earthed frame

(c) Rotor winding to earthed shaft

(d) All of the above

Ans: d

83. Due to which of the following reasons a synchronous motor fails to pull into synchronism after applying D.C. field

current ?

- (a) High field current
- (b) Low short circuit ratio
- (c) High core losses
- (d) Low field current

Ans: d

84. In a synchronous motor, the maximum power developed depends on all of the following except

- (a) rotor excitation
- (b) maximum value of coupling angle
- (c) direction of rotation
- (d) supply voltage

Ans: c

85. In a 3-phase synchronous motor, the negative phase sequence exists when the motor is

- (a) supplied with unbalanced voltage
- (b) under-loaded
- (c) over-loaded
- (d) none of the above

Ans: a

86. In a synchronous motor, damper windings are provided on

- (a) stator frame
- (b) rotor shaft
- (c) pole faces
- (d) none of the above

Ans: c

87. The induced e.m.f. in a synchronous motor working on leading power factor will be

- (a) more than the supply voltage
- (b) less than the supply voltage
- (c) equal to the supply voltage

Ans: a

88. The effect of increasing the load on a synchronous motor running with normal

excitation is to

- (a) decrease both armature current and power factor
- (b) decrease armature current but increase power factor
- (c) increase armature current but decrease power factor
- (d) increase both its armature current and power factor

Ans: c

89. The net armature voltage of a synchronous motor is equal to the

- (a) vector sum of E_b and V
- (b) arithmetic sum of E_b and V
- (c) arithmetic difference of E_b and V
- (d) vector difference of E_b and V

Ans: d

90. The ratio of starting torque to running torque in a synchronous motor is

- (a) zero
- (b) one
- (c) two
- (d) infinity

Ans: a

91. In a synchronous motor, the magnitude of stator back e.m.f. E_b depends on

- (a) load on the motor
- (b) d.c. excitation only
- (c) both the speed and rotor flux
- (d) none of the above

Ans: b

92. A 3-phase synchronous motor is running clockwise. If the direction of its field current is reversed

- (a) the motor will stop
- (b) the motor continue to run in the same direction
- (c) the winding of the motor will burn
- (d) the motor will run in the reverse direction
- (e) none of the above

Ans: b

93. The magnitude of field flux in a 3-phase synchronous motor

- (a) remains constant at all loads
- (b) varies with speed
- (c) varies with the load
- (d) varies with power factor

Ans: a

94. The torque angle, in a synchronous motor, is the angle between

- (a) the supply voltage and the back e.m.f.
- (b) magnetising current and back e.m.f.
- (c) the rotating stator flux and rotor poles
- (d) none of the above

Ans: c

95. Hunting in a synchronous motor cannot be due to

- (a) windage friction
- (b) variable load
- (c) variable frequency
- (d) variable supply voltage

Ans: a

96. By which of the following methods the constant speed of a synchronous motor can be changed to new fixed value ?

- (a) By changing the supply frequency
- (b) By interchanging any two phases
- (c) By changing the applied voltage

(d) By changing the load.

Ans: a

97. In a synchronous motor, V-curves represent relation between

- (a) armature current and field current
- (b) power factor and speed
- (c) field current and speed
- (d) field current and power factor

Ans: a

98. In a 3-phase, 4-pole, 50 Hz synchronous motor, the frequency, pole number and load torque all are halved. The motor speed will be

- (a) 3000 r.p.m.
- (b) 1500 r.p.m.
- (c) 750 r.p.m.
- (d) none of the above

Ans: b

99. A synchronous motor connected to infinite bus-bars has at constant full load, 100% excitation and unity power factor.

On changing the excitation only, the armature current will have

- (a) no change of power factor
- (b) lagging power factor with over-excitation
- (c) leading power factor with under-excitation
- (d) leading power factor with over-excitation

Ans: d

100. Which of the following motors is non-self starting ?

- (a) D.C. series motor
- (b) synchronous motor
- (c) Squirrel cage induction motor
- (d) Wound round induction motor

Ans: b

101. In a synchronous motor if the back e.m.f. generated in the armature at no-load is approximately equal to the applied voltage, then

- (a) the motor is said to be fully loaded
- (b) the torque generated is maximum
- (c) the excitation is said to be zero per cent
- (d) the excitation is said to be hundred per cent

Ans: d

102. In a synchronous motor, the damping winding is generally used to

- (a) prevent hunting and provide the starting torque
- (b) reduce the eddy currents
- (c) provide starting torque only

- (d) reduce noise level
- (e) none of the above

Ans: a

103. If the field of a synchronous motor is underexcited, the power factor will be

- (a) zero
- (b) unity
- (c) lagging
- (d) leading

Ans: c

104. The back e.m.f. in the stator of a synchronous motor depends on

- (a) number of poles
- (b) flux density
- (c) rotor speed
- (d) rotor excitation
- (e) none of the above

Ans: d

105. The maximum value of torque that a synchronous motor can develop without losing its synchronism, is known as

- (a) slip torque
- (b) pull-out torque
- (c) breaking torque
- (d) synchronising torque

Ans: d

106. In a synchronous motor, the armature current has large values for

- (a) high excitation only
- (b) low excitation only
- (c) both high and low excitation
- (d) none of the above

Ans: c

107. Which of the following losses, in a synchronous motor, does not vary with load?

- (a) Windage loss
- (b) Copper losses

- (c) Any of the above
- (d) None of the above

Ans: a

108. The size of a synchronous motor decreases with the increase in

- (a) flux density
- (b) horse power rating
- (c) speed
- (d) all of the above

Ans: a

109. Which of the following losses is not dissipated by the stator core surface in a synchronous motor ?

- (a) Eddy current losses in the conductors
- (b) Iron losses in the stator
- (c) Copper losses in the slot portion of the conductors
- (d) Windage losses
- (e) None of the above

Ans: d

110. The duration of sudden short-circuit test on a synchronous motor is usually about

- (a) one hour
- (b) one minute
- (c) one second
- (d) none of the above

Ans: c

111. The maximum constant load torque under which a synchronous motor will pull into synchronism at rated rotor

supply voltage and frequency is known as

- (a) pull-up torque
- (b) pull-in torque
- (c) pull-out torque
- (d) none of the above

Ans: b

112. A synchronous machine with low value of short-circuit ratio has

- (a) lower stability limit
- (b) high stability limit
- (c) good speed regulation
- (d) good voltage regulation
- (e) none of the above

Ans: a

113. The construction of a synchronous motor resembles

- (a) a series motor
- (b) an induction motor
- (c) an alternator
- (d) a rotary converter

Ans: c

114. If the field winding of an unloaded salient pole synchronous motor is open circuited, the motor will

- (a) stop
- (b) run as induction motor
- (c) function as static condenser
- (d) burn with dense smoke

Ans: a

115. For power factor correction, synchronous motors operate at

- (a) no-load and greatly over-excited fields
- (b) no-load and under-excited fields
- (c) normal load with minimum excitation
- (d) normal load with zero excitation

Ans: a

116. The maximum torque which a synchronous motor will develop at rest for any angular position of the rotor, at rated stator supply voltage and frequency, is known as

- (a) locked-rotor torque
- (b) synchronous torque
- (c) pull up torque
- (d) reluctance torque

Ans: a

117. Exciters of synchronous machines are

- (a) d.c. shunt machines
- (b) d.c. series machines
- (c) d.c. compound machines
- (d) any of the above

Ans: a

118. The coupling angle or load angle of synchronous motor is defined as the angle between the

- (a) rotor and stator teeth
- (b) rotor and the stator poles of opposite polarity
- (c) rotor and the stator poles of the same polarity
- (d) none of the above

Ans: b

119. If the synchronous motor, properly synchronised to the supply is running on no load and is having negligible loss then

- (a) the stator current will be zero
- (b) the stator current will be very small
- (c) the stator current will be very high
- (d) the back e.m.f. will be more than the supply voltage
- (e) none of the above

Ans: a

120 The armature current of the synchronous motor

- (a) has large values for low excitation only
- (b) has large values for high excitation only
- (c) has large values for low and high excitation
- (d) any of the above

Ans: c

121. The maximum power developed in a synchronous motor will depend on

- (a) the rotor excitation only
- (b) the supply voltage only

- (c) the rotor excitation and supply voltage both
- (d) the rotor excitation, supply voltage and maximum value of coupling angle (90°)
- (e) none of the above

Ans: d

122. A synchronous motor which works on a leading power factor and does not drive a mechanical load is called as

- (a) static condenser
- (b) condenser
- (c) synchronous condenser
- (d) none of the above

Ans: c

123. A synchronous motor develops maximum power when load angle is

- (a) 45°
- (b) 60°
- (c) 90°
- (d) 120°

Ans: c

124. In a synchronous motor, the breakdown torque is

- (a) directly proportional to applied voltage
- (b) directly proportional to the square of the applied voltage
- (c) inversely proportional to applied voltage
- (d) none of the above

Ans: a

7. TRANSMISSION AND DISTRIBUTION

1. By which of the following systems electric power may be transmitted ?

- (a) Overhead system
- (b) Underground system
- (c) Both (a) and (b)
- (d) None of the above

Ans: c

2 are the conductors, which connect the consumer's terminals to the distribution

- (a) Distributors
- (b) Service mains
- (c) Feeders
- (d) None of the above

Ans: b

3. The underground system cannot be operated above

- (a) 440 V
- (b) 11 kV
- © 33 kV
- (d) 66 kV

Ans: d

4. Overhead system can be designed for operation upto

- (a) 11 kV
- (b) 33 kV
- © 66 kV
- (d) 400 kV

Ans: c

5. If variable part of annual cost on account of interest and depreciation on the capital outlay is equal to the annual cost of electrical energy wasted in the conductors, the total annual cost will be minimum and the corresponding size of conductor will be most economical. This statement is known as

- (a) Kelvin's law
- (b) Ohm's law
- (c) Kirchhoffs law
- (d) Faraday's law
- (e) none of the above

Ans: a

6. The wooden poles well impregnated with creosote oil or any preservative compound have life

- (a) from 2 to 5 years
- (b) 10 to 15 years 10 to 15 years

- (c) 25 to 30 years 25 to 30 years
- (d) 60 to 70 years 60 to 70 years

Ans: c

7. Which of the following materials is not used for transmission and distribution of electrical power ?

- (a) Copper
- (b) Aluminium
- (c) Steel
- (d) Tungsten

Ans: d

8. Galvanised steel wire is generally used as

- (a) stay wire
- (b) earth wire
- (c) structural components
- (d) all of the above

Ans: d

9. The usual spans with R.C.C. poles are

- (a) 40—50 metres
- (b) 60—100 metres
- (c) 80—100 metres
- (d) 300—500 metres

Ans: c

10. The corona is considerably affected by which of the following ?

- (a) Size of the conductor
- (b) Shape of the conductor
- (c) Surface condition of the conductor
- (d) All of the above

Ans: d

11. Which of the following are the constants of the transmission lines ?

- (a) Resistance
- (b) Inductance

- (c) Capacitance
- (d) All of the above

Ans: d

12 310 km line is considered as

- (a) a long line
- (b) a medium line
- (c) a short line
- (d) any of the above

Ans: a

13. The phenomenon of rise in voltage at the receiving end of the open-circuited or lightly loaded line is called the

- (a) Seeback effect
- (b) Ferranti effect
- (c) Raman effect
- (d) none of the above

Ans: b

14. The square root of the ratio of line impedance and shunt admittance is called the

- (a) surge impedance of the line
- (b) conductance of the line
- (c) regulation of the line
- (d) none of the above

Ans: a

15. Which of the following is the demerit of a 'constant voltage transmission system' ?

- (a) Increase of short-circuit current of the system
- (b) Availability of steady voltage at all loads at the line terminals
- (c) Possibility of better protection for the line due to possible use of higher terminal reactances
- (d) Improvement of power factor at times of moderate and heavy loads
- (e) Possibility of carrying increased power for a given conductor size in case of long-distance heavy power

transmission

Ans: a

16. Low voltage cables are meant for use up to

- (a) 1.1kV
- (b) 3.3kV
- (c) 6.6kV
- (d) 11kV

Ans: e

17. The operating voltage of high voltage cables is upto

- (a) 1.1kV
- (b) 3.3kV
- (c) 6.6kV
- (d) 11kV

Ans: d

18. The operating voltage of supertension cables is upto

- (a) 3.3 kV
- (b) 6.6 kV
- (c) 11 kV
- (d) 33 kV

Ans: d

19. The operating voltage of extra high tension cables is upto

- (a) 6.6 kV
- (b) 11 kV
- (c) 33 kV
- (d) 66 kV
- (e) 132 kV

Ans: d

20. Which of the following methods is used for laying of underground cables ?

- (a) Direct laying
- (b) Draw-in-system
- (c) Solid system
- (d) All of the above

Ans: d

21. Which of the following is the source of heat generation in the cables ?

- (a) Dielectric losses in cable insulation
- (b) losses in the conductor
- (c) Losses in the metallic sheathings and armourings
- (d) All of the above

Ans:

22. Due to which of the following reasons the cables should not be operated too hot ?

- (a) The oil may lose its viscosity and it may start drawing off from higher levels
- (b) Expansion of the oil may cause the sheath to burst
- (c) Unequal expansion may create voids in the insulation which will lead to ionization
- (d) The thermal instability may rise due to the rapid increase of dielectric losses with temperature
- (e) All of the above

Ans: e

23. Which of the following D.C. distribution system is the simplest and lowest in first cost ?

- (a) Radial system
- (b) Ring system
- (c) Inter-connected system
- (d) None of the above

Ans: a

24. A booster is a

- (a) series wound generator
- (b) shunt wound generator
- (c) synchronous generator
- (d) none of the above

Ans: a

25. Besides a method of trial and error, which of the following methods is employed for solution of network problems

in interconnected system ?

- (a) Circulating current method
- (b) Thevenin's theorem
- (c) Superposition of currents
- (d) Direct application of Kirehhoffs laws
- (e) All of the above

Ans: e

26. Which of the following faults is most likely to occur in cables ?

- (a) Cross or short-circuit fault
- (b) Open circuit fault
- (c) Breakdown of cable insulation
- (d) All of the above

Ans: d

27. The cause of damage to the lead sheath of a cable is

- (a) crystallisation of the lead through vibration
- (b) chemical action on the lead when buried in the earth
- (c) mechanical damage

- (d) all of the above

Ans: d

28. The voltage of the single phase supply to residential consumers is

- (a) 110 V
- (b) 210 V
- (c) 230 V
- (d) 400 V

Ans: c

29. Most of the high voltage transmission lines in India are

- (a) underground
- (b) overhead
- (c) either of the above
- (d) none of the above

Ans: b

30. The distributors for residential areas are

- (a) single phase
- (b) three-phase three wire
- (c) three-phase four wire
- (d) none of the above

Ans: c

31. The conductors of the overhead lines are

- (a) solid
- (b) stranded
- (c) both solid and stranded
- (d) none of the above

Ans: b

32. High voltage transmission lines use

- (a) suspension insulators
- (b) pin insulators
- (c) both (a) and (b)
- (d) none of the above

Ans: a

33. Multicore cables generally use

- (a) square conductors
- (b) circular conductors
- (c) rectangular conductors
- (d) sector-shaped conductors

(e) none of the above

Ans: d

34. Distribution lines in India generally use

- (a) wooden poles
- (b) R.C.C. poles
- (c) steel towers
- (d) none of the above

Ans: b

35. The material commonly used for insulation in high voltage cables is

- (a) lead
- (b) paper
- (c) rubber
- (d) none of the above

Ans: b

36. The loads on distributors systems are generally

- (a) balanced
- (b) unbalanced
- (c) either of the above
- (d) none of the above

Ans: b

37. The power factor of industrial loads is generally

- (a) unity
- (b) lagging
- (c) leading
- (d) zero

Ans: b

38. Overhead lines generally use

- (a) copper conductors
- (b) all aluminium conductors
- (c) A.C.S.R. conductors
- (d) none of these

Ans: c

39. In transmission lines the cross-arms are made of

- (a) copper
- (b) wood
- (c) R.C.C.
- (d) steel

Ans: d

40. The material generally used for armour of high voltage cables is

- (a) aluminium

- (b) steel
- (c) brass
- (d) copper

Ans: b

41. Transmission line insulators are made of

- (a) glass
- (b) porcelain
- (c) iron
- (d) P.V.C.

Ans: b

42. The material commonly used for sheaths of underground cables is

- (a) lead
- (b) rubber
- (c) copper
- (d) iron

Ans: a

43. The minimum clearance between the ground and a 220 kV line is about

- (a) 4.3 m
- (b) 5.5 m
- (c) 7.0 m
- (d) 10.5 m

Ans: c

44. The spacing between phase conductors of a 220 kV line is approximately equal to

- (a) 2 m
- (b) 3.5 m
- (c) 6 m
- (d) 8.5 m

Ans: c

45. Large industrial consumers are supplied electrical energy at

- (a) 400 V
- (b) 11 kV
- (c) 66 kV

(d) 400 kV

Ans: c

46. In a D.C. 3-wire distribution system, balancer fields are cross-connected in order to

- (a) boost the generated voltage
- (b) balance loads on both sides of the neutral
- (c) make both machine[^] run as unloaded motors
- (d) equalize voltages on the positive and negative outers

Ans: d

47. In a D.C. 3-wire distributor using balancers and having unequal loads on the two sides

- (a) both balancers run as generators
- (b) both balancers run as motors
- (c) balancer connected to lightly- loaded side runs as a motor
- (d) balancer connected to heavily- loaded side runs as a motor

Ans: c

48. Transmitted power remaining the same, if supply voltage of a D.C. 2-wire feeder is increased 100 percent, saving in copper is

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

Ans: b

49. A uniformly-loaded D.C. distributor is fed at both ends with equal voltages. As compared to a similar distributor fed at one end only, the drop at the middle point is

- (a) one-fourth
- (b) one-third
- (c) one-half
- (d) twice
- (e) none of the above

Ans: a

50. As compared to a 2-wire D.C. distributor, a 3-wire distributor with samemaximum voltage to earth uses only

- (a) 31.25 percent of copper

- (b) 33.3 percent of copper
- (c) 66.7 percent of copper
- (d) 125 percent of copper

Ans: a

51. Which of the following is usually not the generating voltage ?

- (a) 6.6 kV
- (b) 8.8 kV
- (c) 11 kV
- (d) 13.2 kV

Ans: b

52. For an overhead line, the surge impedance is taken as

- (a) 20-30 ohms
- (b) 70—80 ohms
- (c) 100—200 ohms
- (d) 500—1000 ohms
- (e) none of the above

Ans: c

53. The presence of ozone due to corona is harmful because it

- (a) reduces power factor
- (b) corrodes the material
- (c) gives odour
- (d) transfer energy to the ground
- (e) none of the above

Ans: b

54. A feeder, in a transmission system, feeds power to

- (a) distributors
- (b) generating stations
- (c) service mains
- (d) all of the above

Ans: a

55. The power transmitted will be maximum when

- (a) corona losses are minimum
- (b) reactance is high
- (c) sending end voltage is more
- (d) receiving end voltage is more

Ans: c

56. A 3-phase 4 wire system is commonly used on

- (a) primary transmission
- (b) secondary transmission
- (c) primary distribution
- (d) secondary distribution

Ans: d

57. Which of the following materials is used for overhead transmission lines ?

- (a) Steel cored aluminium
- (b) Galvanised steel
- (c) Cadmium copper
- (d) Any of the above

Ans: d

58. Which of the following is not a constituent for making porcelain insulators ?

- (a) Quartz
- (b) Kaolin
- (c) Felspar
- (d) Silica

Ans: d

59. There is a greater possibility of occurrence of corona during

- (a) dry weather
- (b) winter
- (c) summer heat
- (d) humid weather
- (e) none of the above

Ans: d

60. Which of the following relays is used on long transmission lines ?

- (a) Impedance relay
- (b) Mho's relay
- (c) Reactance relay
- (d) None of the above

Ans: b

61. The steel used in steel cored conductors is usually

- (a) alloy steel
- (b) stainless steel
- (c) mild steel
- (d) high speed steel
- (e) all of the above

Ans: c

62. Which of the following distribution systems is more reliable ?

- (a) Radial system
- (b) Tree system
- (c) Ring main system
- (d) All are equally reliable

Ans: c

63. Which of the following characteristics should the line supports for transmission lines

possess ?

- (a) Low cost
- (b) High mechanical strength
- (c) Longer life
- (d) All of the above

Ans: d

64. Transmission voltage of 11kV is normally used for distances upto

- (a) 20—25 km
- (b) 40—50 km
- (c) 60—70 km
- (d) 80—100 km

Ans: a

65. Which of the following regulations is considered best?

- (a) 50%
- (b) 20%
- (c) 10%
- (d) 2%

Ans: d

66. Skin effect is proportional to

- (a) (conductor diameter)
- (b) (conductor diameter)
- (c) (conductor diameter)
- (d) (conductor diameter)
- (e) none of the above

Ans: c

67. A conductor, due to sag between two supports, takes the form of

- (a) semi-circle
- (b) triangle
- (c) ellipse
- (d) catenary

Ans: d

68. In A.C.S.R. conductors, the insulation between aluminium and steel conductors is

- (a) insulim
- (b) bitumen
- (c) varnish
- (d) no insulation is required

Ans: d

69. Which of the following bus-bar schemes has the lowest cost ?

- (a) Ring bus-bar scheme
- (b) Single bus-bar scheme
- (c) Breaker and a half scheme
- (d) Main and transfer scheme

Ans: b

70. Owing to skin effect

- (a) current flows through the half cross-section of the conductor
- (b) portion of the conductor near the surface carries more current and core of the conductor carries less current
- (c) portion of the conductor near the surface carries less current and core of the conductor carries more current
- (d) any of the above
- (e) none of the above

Ans: b

71. By which of the following methods string efficiency can be improved ?

- (a) Using a guard ring
- (b) Grading the insulator
- (c) Using long cross arm
- (d) Any of the above
- (e) None of the above

Ans: d

72. In aluminium conductors, steel core is provided to

- (a) compensate for skin effect
- (b) neutralise proximity effect
- (c) reduce line inductance
- (d) increase the tensile strength

Ans: d

73. By which of the following a bus-bar is rated ?

- (a) Current only
- (b) Current and voltage
- (c) Current, voltage and frequency
- (d) Current, voltage, frequency and short time current

Ans: d

74. A circuit is disconnected by isolators when

- (a) line is energized
- (b) there is no current in the line
- (c) line is on full load

(d) circuit breaker is not open

Ans: b

75. For which of the following equipment current rating is not necessary ?

- (a) Circuit breakers
- (b) Isolators
- (c) Load break switch
- (d) Circuit breakers and load break switches

Ans: b

76. In a substation the following equipment is not installed

- (a) exciters
- (b) series capacitors
- (c) shunt reactors
- (d) voltatire transformers

Ans: a

77. iCorona usually occurs when the electrostatic stress in air around the conductor exceeds

- (a) 6.6 kV (r.m.s. value)/cm
- (b) 11 kV (r.m.s. value)/cm
- (c) 22 kV (maximum value)/cm
- (d) 30 kV (maximum v^alue)/cm

Ans: d

78. The voltage drop, for constant voltage transmission is compensated by installing

- (a) inductors
- (b) capacitors
- (c) synchronous motors
- (d) all of above
- (e) none of the above

Ans: c

79. The use of strain type insulators is made where the conductors are

- (a) dead ended
- (b) at intermediate anchor towers
- (c) any of the above
- (d) none of the above

Ans: c

80. The current drawn by the line due to corona losses is

- (a) non-sinusoidal
- (b) sinusoidal
- (c) triangular
- (d) square

Ans: a

81. Pin type insulators are generally not used for voltages beyond

- (a) 1 kV
- (b) 11 kV
- (c) 22 kV
- (d) 33 kV

Ans: d

82. Aluminium has a specific gravity of

- (a) 1.5
- (b) 2.7
- (c) 4.2
- (d) 7.8

Ans: b

83. For transmission of power over a distance of 200 km, the transmission voltage should be

- (a) 132 kV
- (b) 66 kV
- (c) 33 kV
- (d) 11 kV

Ans: a

84. For aluminium, as compared to copper, all the following factors have higher values except

- (a) specific volume
- (b) electrical conductivity
- (c) co-efficient of linear expansion

(d) resistance per unit length for same cross-section

Ans: b

85. Which of the following equipment, for regulating the voltage in distribution feeder, will be most economical ?

- (a) Static condenser
- (b) Synchronous condenser
- (c) Tap changing transformer
- (d) Booster transformer

Ans: d

86. In a tap changing transformer, the tapplings are provided on

- (a) primary winding
- (b) secondary winding
- (c) high voltage winding
- (d) any of the above

Ans: b

87. Constant voltage transmission entails the following disadvantage

- (a) large conductor area is required for same power transmission
- (b) short-circuit current of the system is increased
- (c) either of the above
- (d) none of the above

Ans: b

88. On which of the following factors skin effect depends ?

- (a) Frequency of the current
- (b) Size of the conductor
- (c) Resistivity of the conductor material
- (d) All of the above

Ans: d

89. The effect of corona can be detected by

- (a) presence of zone detected by odour
- (b) hissing sound
- (c) faint luminous glow of bluish colour

(d) all of the above

Ans: d

90. For transmission of power over a distance of 500 km, the transmission voltage should be in the range

(a) 150 to 220 kV

(b) 100 to 120 kV

(c) 60 to 100 kV

(d) 20 to 50 kV

Ans: a

91. In the analysis of which of the following lines shunt capacitance is neglected ?

(a) Short transmission lines

(b) Medium transmission lines

(c) Long transmission lines

(d) Medium as well as long transmission lines

Ans: a

92. When the interconnector between two stations has large reactance

(a) the transfer of power will take place with voltage fluctuation and noise

(b) the transfer of power will take place with least loss

(c) the stations will fall out of step because of large angular displacement between the stations

(d) none of the above

Ans: c

93. The frequency of voltage generated, in case of generators, can be increased by

(a) using reactors

(b) increasing the load

(c) adjusting the governor

(d) reducing the terminal voltage

(e) none of the above

Ans: c

94. When an alternator connected to the bus-bar is shut down the bus-bar voltage will

(a) fall

- (b) rise
- (c) remain unchanged
- (d) none of the above

Ans: c

95. The angular displacement between two interconnected stations is mainly due to

- (a) armature reactance of both alternators
- (b) reactance of the interconnector
- (c) synchronous reactance of both the alternators
- (d) all of the above

Ans: a

96. Electro-mechanical voltage regulators are generally used in

- (a) reactors
- (b) generators
- (c) transformers
- (d) all of the above

Ans: b

97. Series capacitors on transmission lines are of little use when the load VAR requirement is

- (a) large
- (b) small
- (b) fluctuating
- (d) any of the above

Ans: b

98. The voltage regulation in magnetic amplifier type voltage regulator is effected by

- (a) electromagnetic induction
- (b) varying the resistance
- (c) varying the reactance
- (d) variable transformer

Ans: c

99. When a conductor carries more current on the surface as compared to core, it is due to

- (a) permeability variation

- (b) corona
- (c) skin effect
- (d) unsymmetrical fault
- (e) none of the above

Ans: c

100. The following system is not generally used

- (a) 1-phase 3 wire
- (b) 1-phase 4 wire
- (c) 3-phase 3 wire
- (d) 3-phase 4 wire

Ans: a

101. The skin effect of a conductor will reduce as the

- (a) resistivity of conductor material increases
- (b) permeability of conductor material increases
- (c) diameter increases
- (d) frequency increases

Ans: a

102. When a live conductor of public electric supply breaks down and touches the earth which of the following will happen ?

- (a) Current will flow to earth
- (b) Supply voltage will drop
- (c) Supply voltage will increase
- (d) No current will flow in the conductor
- (e) None of the above

Ans: a

8. CABLES

1. The insulating material for a cable should have

- (a) low cost
- (b) high dielectric strength
- (c) high mechanical strength
- (d) all of the above

Ans: d

2. Which of the following protects a cable against mechanical injury ?

- (a) Bedding
- (b) Sheath
- (c) Armouring
- (d) None of the above

Ans: c

3. Which of the following insulation is used in cables ?

- (a) Varnished cambric
- (b) Rubber
- (c) Paper
- (d) Any of the above

Ans: d

4. Empire tape is

- (a) varnished cambric
- (b) vulcanised rubber
- (c) impregnated paper
- (d) none of the above

Ans: a

5. 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

Ans: c

6. The bedding on a cable consists of

- (a) hessian cloth
- (b) jute
- (c) any of the above
- (d) none of the above

Ans: c

7. The insulating material for cables should

- (a) be acid proof
- (b) be non-inflammable
- (c) be non-hygroscopic
- (d) have all above properties

Ans: d

8. In a cable immediately above metallic sheath is provided.

- (a) earthing connection
- (b) bedding
- (c) armouring
- (d) none of the above

Ans: b

9. 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
- (e) none of the above

Ans: c

10. In case of three core flexible cable the colour of the neutral is

- (a) blue
- (b) black
- (c) brown
- (d) none of the above

Ans: a

11. cables are used for 132 kV lines.

- (a) High tension
- (b) Super tension
- (c) Extra high tension
- (d) Extra super voltage

Ans: d

12. Conduit pipes are normally used to protect cables.

- (a) unsheathed cables
- (b) armoured
- (c) PVC sheathed cables
- (d) all of the above

Ans: a

13. The minimum dielectric stress in a cable is at

- (a) armour
- (b) bedding
- (c) conductor surface
- (d) lead sheath

Ans: d

14. 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

Ans: a

15. Dielectric strength of rubber is around

- (a) 5 kV/mm
- (b) 15 kV/mm
- (c) 30 kV/mm
- (d) 200 kV/mm

Ans: c

16. Low tension cables are generally used upto

- (a) 200 V
- (b) 500 V
- (c) 700 V
- (d) 1000 V

Ans: d

17. In a cable, the maximum stress under operating conditions is at

- (a) insulation layer

- (b) sheath
- (c) armour
- (d) conductor surface

Ans: d

18. High tension cables are generally used upto

- (a) 11kV
- (b) 33kV
- (c) 66 kV
- (d) 132 kV

Ans: a

19. The surge resistance of cable is

- (a) 5 ohms
- (b) 20 ohms
- (c) 50 ohms
- (d) 100 ohms

Ans: c

20. PVC stands for

- (a) polyvinyl chloride
- (b) post varnish conductor
- (c) pressed and varnished cloth
- (d) positive voltage conductor
- (e) none of the above

Ans: a

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

Ans: c

22. In capacitance grading of cables we use a dielectric.

- (a) composite
- (b) porous

- (c) homogeneous
- (d) hygroscopic

Ans: a

23. Pressure cables are generally not used beyond

- (a) 11 kV
- (b) 33 kV
- (c) 66 kV
- (d) 132 kV

Ans: c

24. 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

Ans: c

25. Cables, generally used beyond 66 kV are

- (a) oil filled
- (b) S.L. type
- (c) belted

- (d) armoured

Ans: a

26. 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

Ans: a

27. 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

Ans: d

28. If the length of a cable is doubled, its capacitance

(a) becomes one-fourth

(b) becomes one-half

(c) becomes double

(d) remains unchanged

Ans: c

29. 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°

Ans: b

30. 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

Ans: a

31. 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

(c) 15 kV/mm

(d) 30 kV/mm

Ans: b

32. In the cables, sheaths are used to

(a) prevent the moisture from entering the cable

(b) provide enough strength

- (e) provide proper insulation
- (d) none of the above

Ans: a

33. The intersheaths 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

Ans: c

34. 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
- (e) none of the above

Ans: c

35. 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

Ans: c

36. 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

Ans: a

37. 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

Ans: b

38. In a cable the voltage stress is maximum at

- (a) sheath
- (b) insulator
- (c) surface of the conductor
- (d) core of the conductor

Ans: d

39. 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
- (e) none of the above

Ans: a

40. 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 passing vehicles, etc.
- (d) for all of the above reasons

Ans: c

41. 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

Ans: c

42. The thickness of metallic shielding on cables is usually

- (a) 0.04 mm
- (b) 0.2 to 0.4 mm

- (e) 3 to 5 mm
- (d) 40 to 60 mm

Ans: a

43. Cables for 220 kV lines are invariably

- (a) mica insulated
- (b) paper insulated
- (c) compressed oil or compressed gas insulated
- (d) rubber insulated
- (e) none of the above

Ans: c

44. 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
- (e) none of the above

Ans: d

45. 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

Ans: c

46. Copper as conductor for cables is used as

- (a) annealed
- (b) hardened and tempered
- (c) hard drawn
- (d) alloy with chromium

Ans: a

47. The insulating material should have

- (a) low permittivity
- (b) high resistivity
- (c) high dielectric strength
- (d) all of the above

Ans: d

48. 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

Ans: d

49. 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

Ans: a

50. 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

Ans: d

51. It is difficult to maintain oil filled cables.

- (a) Yes
- (b) No

Ans: a

51. In capacitance grading a homogeneous dielectric is used.

- (a) Yes
- (b) No

Ans: b

52. In congested areas where excavation is expensive and inconvenient 'draw in system' of laying of underground cables is often adopted.

(a) Yes

(b) No

Ans: a

53. Natural rubber is obtained from milky sap of tropical trees.

(a) Yes

(b) No

Ans: a

54. Rubber is most commonly used insulation in cables.

(a) Yes

(b) No

Ans: a

55. Polyethylene has very poor dielectric and ageing properties.

(a) Yes

(b) No

Ans: b

56. The metallic sheath may be made of lead or lead alloy or of aluminium.

(a) Yes

(b) No

Ans: b