

D.C. MOTORS Multiple Choice Questions :-

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 rriorator 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) loss 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 tried?

- (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) 100%
- (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 be used to determine the direction of rotation of D.C. motor ?

- (a) Lenz's law
- (b) Faraday's law
- (c) Coulomb'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 along with 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) cumulativelyc'ompounded

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. The 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

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 run motor)
- (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 Hght 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. series motors 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
- (b) 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
- (b) 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

TRANSFORMERS Multiple Choice Questions with Answers

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

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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: c

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

- (a) 1kV
- (b) 33 kV
- (c) 100 kV
- (d) 330 kV

Answer: 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

Answer: 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

Answer: a

11. The efficiency of a transformer will be maximum when

- (a) copper losses = hysteresis losses
- (b) hysteresis losses = eddy current losses
- (c) eddy current losses = copper losses
- (d) copper losses = iron losses

Answer: d

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°

Answer: 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

Answer: c

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

- (a) Conservator
- (b) Breather
- (c) Buchholz relay
- (d) Exciter

Answer: 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

Answer: 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

Answer: a

17. A transformer transforms

- (a) voltage
- (b) current
- (c) power
- (d) frequency

Answer: 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 flux is zero
- (d) none of the above

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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°

Answer: 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)

Answer: 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

Answer: c

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

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

Answer: a

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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: c

35. The power transformer is a constant

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

Answer: 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

Answer: 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^2
- (d) R_2/K

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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.

Answer: b

43. The chemical used in breather is

- (a) asbestos fiber
- (b) silica sand
- (c) sodium chloride
- (d) silica gel

Answer: d

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

- (a) true
- (b) false

Answer: b

45. The transformer ratings are usually expressed in terms of

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

Answer: d

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

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

Answer: c

47. Hysteresis loss in a transformer varies as B_{max} = maximum flux density)

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

Answer: b

48. Material used for construction of transformer core is usually

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

Answer: 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

Answer: 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

Answer: d

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

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

Answer: d

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

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

Answer: d

53. A transformer oil must be free from

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

Answer: d

54. A Buchholz relay can be installed on

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

Answer: 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

Answer: 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

Answer: d

57. Distribution transformers are generally designed for maximum efficiency around

- (a) 90% load
- (b) zero load
- (c) 25% load
- (d) 50% load

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: a

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

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

Answer: 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

Answer: 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

Answer: a

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

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

Answer: b

67. Noise level test in a transformer is a

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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: a

93. Open circuit test on transformers is conducted to determine

- (a) hysteresis losses
- (b) copper losses
- (c) core losses
- (d) eddy current losses

Answer: c

94. Short circuit test on transformers is conducted to determine

- (a) hysteresis losses
- (b) copper losses
- (c) core losses
- (d) eddy current losses

Answer: 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.

Answer: b

96. The transformer oil should have _____ volatility and _____ viscosity.

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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: c

103. A transformer transforms

- (a) voltage
- (b) current
- (c) current and voltage
- (d) power

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: a

110. Which of the following statements regarding an ideal single-phase transformer having a turn ratio of 1 : 2 and drawing a current of 10 A from 200 V A.C. supply is incorrect ?

- (a) Its secondary current is 5 A
- (b) Its secondary voltage is 400 V
- (c) Its rating is 2 kVA
- (d) Its secondary current is 20 A
- (e) It is a step-up transformer

Answer: d

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

Answer: a

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

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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: b

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

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

Answer: c

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

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

Answer: a

120. The noise produced by a transformer is termed as

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

Answer: 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

Answer: 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

Answer: 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

Answer: b

124. The hum in a transformer is mainly attributed to

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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: 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

Answer: c

136. If a transformer is switched on to a voltage more than the rated voltage

- (a) its power factor will deteriorate
- (b) its power factor will increase
- (c) its power factor will remain unaffected
- (d) its power factor will be zero

Answer: a

137. Auto-transformer makes effective saving on copper and copper losses, when its transformation ratio is

- (a) approximately equal to one
- (b) less than one
- (c) great than one
- (d) none of the above

Answer: a

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

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

Answer: c

139. In a step-down transformer, there is a change of 15 A in the load current. This results in change of supply current of

- (a) less than 15 A
- (b) more than 15 A
- (c) 15 A
- (d) none of the above

Answer: a

140. The efficiencies of transformers compared with that of electric motors of the same power are

- (a) about the same
- (b) much smaller
- (c) much higher
- (d) somewhat smaller
- (e) none of the above

Answer: c