Electrical Drives Questions and Answers PDF

1. The basic elements of an electric drive are :

(a) electric motor and the transmission system.

(b) electric motor, the transmission and control system.

(c) the transmission and control system.

(d) electric motor and conversion equipment.

Answer: (b) electric motor, the transmission and control system.

2. Electric drive is becoming more and more popular because

(a) it is simple, clean, compact and reliable.

(b) it provides easy and smooth control, flexibility in layout easy starting and facility for remote control.

(c) it is cheaper in initial as well as in maintenance cost.

(d) all of the above.

Answer: (d) all of the above.

3. The main drawback of electric drive is that

(a) it is cumbersome drive.

(b) it is costlier in initial as well as in maintenance cost.

(c) electrical power supply failure makes the drive standstill.

(d) all of the above.

Answer: (c) electrical power supply failure makes the drive standstill.

4. An existing workshop is to be changed over from an engine drive to an electric drive. The type of drive likely to be adopted is

(a) individual drive.

(b) group drive.

(c) multimotor drive.

(d) any of the above.

Answer: (b) group drive.

5. The type of drive used for a paper mill requiring constant speed operation and flexibility of control is

(a) group drive.

(b) multimotor drive.

(c) individual or multimotor drive.

(d) individual drive.

Answer: (c) individual or multimotor drive.

6. Introduction of automation in production processes has become possible only because of use of

(a) an electric drive.

(b) group drives.

(c) individual and multimotor drives.

(d) individual drive.

Answer: (c) individual and multimotor drives.

7. The selection of an electric motor is governed by

(a) nature of load to be handled.

(b) environmental conditions.

(c) nature of electric supply available.

(d) all of the above.

Answer: (d) all of the above.

8. DC motors are still preferred for use in

(a) electric excavators, steel mills and cranes.

(b) lathes and machine tools.

(c) flour mills and jaw crushers.

(d) paper industry.

Answer: (a) electric excavators, steel mills and cranes.

9. The least significant electrical characteristic in selection of electric motor for a flour mill is

(a) starting characteristics.

(b) braking.

(c) running characteristics.

(d) efficiency.

Answer: (b) braking.

10. The least significant feature while selecting a motor for centrifugal pump is

(a) speed control.

(b) power rating of motor.

(c) operating speed.

(d) starting characteristics.

Answer: (a) speed control.

11. A typical active load is

(a) hoist.

(b) blower.

(c) pump.

(d) lathe.

Answer: (a) hoist.

12. An elevator drive is required to operate in

(a) one quadrant only.

(b) two quadrants.

(c) three quadrants.

(d) four quadrants.

Answer: (d) four quadrants.

13. Load torque constant at all speeds is represented by a

(a) fan.

(b) compressor.

(c) centrifugal pump load.

Answer: (b) compressor.

14. An example of a motor having short-time duty is found in

(a) centrifugal pumps.

(b) crane drives.

(c) drilling machines.

(d) all of the above.

Answer: (b) crane drives.

15. The load, for which the motor always starts on load is

(a) fan motor.

(b) conveyor motor.

(c) flour mill motor.

(d) all of the above.

Answer: (d) all of the above.

16. The load cycle for a motor driving a power press will be

(a) continuous.

(b) variable.

(c) intermittent and variable.

(d) continuous but periodical.

Answer: (d) continuous but periodical.

17. The application(s) that need(s) frequent starting and stopping is/ are

(a) paper mills.

(b) lifts and hoists.

(c) blowers and fans.

(d) grinding mills.

Answer: (b) lifts and hoists.

18. An electric motor, in jaw crushers, has to often start against

(a) heavy load.

(b) normal load.

(c) medium load.

(d) low load.

Answer: (a) heavy load.

19. The application(s) in which the load on the motor changes in cyclic order is/are

(a) rolling mills.

(b) cranes.

(c) electric shovels.

(d) all of the above.

Answer: (d) all of the above.

20. The machine having heavy fluctuation of load is

(a) lathe.

(b) planer.

(c) punching machine.

(d) printing machine.

Answer: (c) punching machine.

21. Variable speed operation is preferred in

(a) water pump.

(b) ceiling fan.

(c) exhaust fan.

(d) refrigerator.

Answer: (b) ceiling fan.

22. The application in which the motor is to start with high acceleration is

(a) lifts and hoists.

(b) centrifugal pump.

(c) oil expeller.

(d) flour mill.

Answer: (a) lifts and hoists.

23. While selecting a motor for air-conditioner the feature of utmost importance is

(a) type of enclosure.

(b) type of bearing.

(c) noise.

(d) power transmission arrangement.

Answer: (c) noise.

24. Belt conveyors offer.....starting torque.

(a) high

(b) medium

(c) low

(d) zero

Answer: (a) high

25. The characteristic(s) of drive for crane hoisting anti lowering is are

(a) fast speed control.

(b) smooth movement.

(c) precise control.

(d) all of the above.

Answer: (d) all of the above.

26. The capacity of a crane is expressed in terms of

(a) span.

(b) tonnes.

(c) type of drive.

(d) any of the above.

Answer: (b) tonnes.

27. The travelling speed of a crane varies from

(a) 20 to 25 m/s.

(b) 10 to 20 m/s.

(c) 1.0 to 2.5 m/s.

(d) 0.2 to 1.0 m/s.

Answer: (c) 1.0 to 2.5 m/s.

28. Light duty cranes are generally used in

(a) power houses.

(b) pumping stations.

(c) automobile workshops.

(d) all of the above.

Answer: (d) all of the above.

29. Heavy duty cranes are employed in

(a) powerhouses and pumping stations.

(b) automobile workshops.

(c) steel plants and ore handling plants.

(d) both (a) and (c).

Answer: (c) steel plants and ore handling plants.

30. In case of centrifugal pumps the starting torque is usually

(a) less than running torque.

(b) same as running torque.

(c) slightly higher than running torque.

(d) double of running torque.

Answer: (a) less than running torque.

31. The size of an excavator is usually expressed in terms of

(a) crowd motion.

(b) m^3.

(c) travel in metres.

(d) angle of swing.

Answer: (b) m^3.

32. The range of rating of electric motor used for rolling mills is of the order of

(a) 10 to 25 kW

(b) 25 to 85 kW

(c) 85 to 400 kW

(d) 400 to 1,000 kW

Answer: (c) 85 to 400 kW

33. If the liquid to be pumped has relative density of 1.25, the output power required in comparison to that required for pumping water in case of centrifugal pump will be

(a) 1.25 times.

(b) the same.

(c) 0.8 times.

(d) 15 times (roughly).

Answer: (a) 1.25 times.

34. The load torque decreases with the increase in speed in case of

(a) lathes, boring machines, milling machines.

(b) hoist winches, machine tool feed mechanism.

(c) blowers, fans, centrifugal pumps.

(d) both (a) and (b).

Answer: (a) lathes, boring machines, milling machines.

35. In synthetic fiber mills motors with

(a) variable speeds are required.

(b) constant speeds are preferred.

(c) low starting torque are required.

(d) high starting torque are preferred.

Answer: (b) constant speeds are preferred.

36. In case of kiln drives, starting torque is

(a) more than double of the running torque.

(b) almost √2 times of the running torque.

(c) almost equal to running torque.

(d) almost zero.

Answer: (a) more than double of the running torque.

37. The diameter of the rotor shaft for an electric motor depends upon

(a) speed only.

(b) power output only.

(c) speed and power output.

(d) speed, power output and power factor.

Answer: (c) speed and power output.

38. Which one of the following is not necessarily the advantage of dc motors over ac motors ?

(a) Low cost.

(b) Excellent torque and speed operating characteristics.

(c) Flexible speed control.

(d) None of the above.

Answer: (a) Low cost.

39. An electric train employing a dc series motor is running at a fixed speed, when a sudden slight drop in the mains voltage occurs. This would result in

(a) drop in speed and rise in current.

(b) rise in speed and drop in current.

(c) rise in speed and rise in current.

(d) drop in speed with current unaltered.

Answer: (a) drop in speed and rise in current.

40. A dc series motor is used for an overhauling load. It can work stably if

(a) the armature is shunted by a resistor.

(b) the field winding is reversed.

(c) a resistor is put in series with the machine.

(d) a divertor is put across the field.

Answer: (a) the armature is shunted by a resistor.

41. DC series motors are very suitable for heavy duty applications such as electric railways, rolling mills because of

(a) low initial as well as maintenance cost.

(b) high starting torque.

(c) possibility of speed control.

(d) nearly constant speed.

Answer: (b) high starting torque.

42. A flywheel is normally fitted to

(a) dc series motor driving a constant torque load.

(b) separately excited dc motor driving pulsed torque load.

(c) cumulatively compound motor driving pulsed torque load.

(d) differentially compound motor driving pulsed torque load.

Answer: (c) cumulatively compound motor driving pulsed torque load.

43. Which motor should not be used for centrifugal pumps ?

(a) Shunt.

(b) Series.

(c) Cumulatively compound.

(d) Differentially compound.

Answer: (b) Series.

44. For continuously running roiling mills with intermittent loading, the most suitable dc drive is

(a) dc series motor.

(b) dc shunt motor.

(c) dc differentially compounded motor.

(d) dc cumulatively compounded motor.

Answer: (d) dc cumulatively compounded motor.

45. For quick speed reversal the motor preferred is

(a) dc motor.

(b) squirrel cage induction motor.

(c) slip-ring induction motor.

(d) synchronous motor.

Answer: (a) dc motor.

46. The motor, owing to its inherent characteristics, best suited for the rolling mills is

(a) dc shunt motor.

(b) dc cumulative compound wound motor.

(c) squirrel cage induction motor.

(d) synchronous motor.

Answer: (b) dc cumulative compound wound motor.

47. Squirrel cage induction motors with high slip and slip-ring induction motors develop maximum torque at standstill and are used for

(a) elevators.

(b) machine tools.

(c) presses and punches.

(d) all of the above.

Answer: (c) presses and punches.

48. Belted slip-ring induction motor is almost invariably employed for

(a) conveyors.

(b) jaw-crushers.

(c) centrifugal blowers.

(d) water pumps.

Answer: (b) jaw-crushers.

49. Belted would induction motors are preferred for

(a) gyratory crushers.

(b) screw pumps.

(c) machine tools.

(d) water pumps.

Answer: (a) gyratory crushers.

50. The pair used for frequency converters is

(a) squirrel cage induction motor and synchronous motor.

(b) slip-ring induction motor and synchronous motor.

(c) slip-ring induction motor and squirrel cage induction motor.

(d) all of above.

Answer: (a) squirrel cage induction motor and synchronous motor.

51. For the same rating, the size of the single-phase induction motor is about……..that of the corresponding three-phase induction motor.

(a) three times

(b) the same as

(c) 1.5 times

(d) one-third

Answer: (c) 1.5 times

52. A fluctuating voltage supply is detrimental to a refrigerator motor but not to a ceiling fan, although both are single-phase induction motors because, the refrigerator motor

(a) is made more robust than the fan motor.

(b) is subjected to short-duty cycle but the fan motor is subjected to continuous duty.

(c) is enclosed in a sealed unit while the fan motor is open to the environment.

(d) load is constant, but the fan motor load is voltage dependent.

Answer: (d) load is constant, but the fan motor load is voltage dependent.

53. Ward-Leonard controlled dc drives are usually used for……duty excavators.

(a) light

(b) medium

(c) heavy

Answer: (c) heavy

54. Speed control by variation of field flux results in

(a) constant power drive.

(b) variable power drive.

(c) constant torque drive.

(d) variable torque drive.

Answer: (a) constant power drive.

55. In variable speed dc motor drive the armature voltage control leads to

(a) constant power operation.

(b) constant torque operation.

(c) variable torque operation.

(d) randomly varying power operation.

Answer: (b) constant torque operation.

56. Speed of an induction motor is controlled by injecting voltage into the rotor winding. Frequency of the injected voltage should be

(a) main frequency.

(b) frequency corresponding to required speed.

(c) frequency corresponding to rotor speed.

(d) slip frequency

Answer: (d) slip frequency

57. The slip power recovery scheme is used in induction motor for speed control in the range

(a) above synchronous speed.

(b) below synchronous speed.

(c) both above and below synchronous speed.

(d) none of the above.

Answer: (c) both above and below synchronous speed.

58. The electric braking system commonly employed in rolling mills, elevators and printing presses is

(a) plugging.

(b) rheostatic.

(c) dynamic.

(d) regenerative.

Answer: (a) plugging.

59. For rheostatic braking of two series motors connected in parallel

(a) cross-connection is better.

(b) equaliser connection is better.

(c) both are equally good.

(d) none of the two is required.

Answer: (a) cross-connection is better.

60. Dynamic braking is employed to brake

(a) non-reversing drive.

(b) reversing drive.

(c) in both (a) and (b).

Answer: (c) in both (a) and (b).

61. The condition of regenerative braking can be achieved by

(a) speed higher than no-load speed of overhauling load.

(b) increasing the excitation while supply voltage remains constant.

(c) increasing the armature current.

(d) either (a) or (b).

Answer: (d) either (a) or (b).

62. In a dc shunt motor, regenerative braking is limited by

(a) saturation of flux at high speed.

(b) saturation of flux at low speed.

(c) armature current at high speed.

(d) either (a) or (b).

Answer: (b) saturation of flux at low speed.

63. For regenerative braking with dc series motors, its field windings are excited.

(a) separately

(b) series

(c) shunt

(d) either

(b) or (c)

Answer: (a) separately

64. The most economical method of electric braking is

(a) plugging

(b) dynamic braking with separate excitation.

(c) dynamic braking with self excitation.

(d) regenerative braking.

Answer: (d) regenerative braking.

65. The plugging provides……..braking torque in comparison to rheostatic and regenerative braking systems.

(a) negligible

(b) small

(c) highest

Answer: (c) highest

66. Rheostatic braking may be applied to an induction motor provided

(a) it is a squirrel cage type.

(b) it is a wound type.

(c) separate dc source for field excitation is available.

(d) variable external resistance is available.

Answer: (c) separate dc source for field excitation is available.

67. The motor enclosure used for collieries, chemical plants is

(a) flame proof type.

(b) splash proof type.

(c) totally enclosed type.

(d) pipe ventilated type.

Answer: (a) flame proof type.

68. The motor enclosure used in woodworking industry is

(a) protected type.

(b) totally enclosed fan cooled type.

(c) flame-proof type.

(d) splash-proof type.

Answer: (b) totally enclosed fan cooled type.

69. The motor enclosure used for industrial purposes is

(a) protected type.

(b) drip proof type.

(c) totally enclosed type.

(d) open type.

Answer: (a) protected type.

70. Rotor of a motor is usually supported on

(a) bush hearings.

(b) thrust bearing.

(c) ball or roller bearings.

(d) any of the above.

Answer: (c) ball or roller bearings.

71. Ball-bearings are

(a) used up to 75 kW motors.

(b) of long life and low friction loss.

(c) costlier and noisy particularly at high motor speed.

(d) all of the above.

Answer: (d) all of the above.

72. Sleeve bearings

(a) are normally of bronze.

(b) have self-lubricating properties.

(c) are used where noise is to be avoided.

(d) all of the above.

Answer: (d) all of the above.

73. Hot bearings of a dc motor may be caused by

(a) poor ventilation.

(b) incorrect voltage.

(c) loose coupling.

(d) lack of or dirty lubricant.

Answer: (d) lack of or dirty lubricant.

74. Excessive motor vibration is caused by

(a) worn bearings.

(b) open armature coil.

(c) bent shaft.

(d) excessive brush tension.

Answer: (a) worn bearings.

75. Excessive sparking at the brushes may be caused due to

(a) loose coupling.

(b) worn bearings.

(c) dirt on commutator.

(d) open armature coil.

Answer: (c) dirt on commutator.

76. Intermittent sparking at the brushes of a dc motor may be caused due to

(a) intermittent load.

(b) open armature coil.

(c) loose coupling.

(d) incorrect voltage.

Answer: (b) open armature coil.

77. The least expensive drive is

(a) belt drive.

(b) rope drive.

(c) chain drive.

(d) gear drive.

Answer: (a) belt drive.

78. For very high speed ratio the indispensable drive is

(a) direct drive.

(b) rope drive.

(c) chain drive.

(d) any of the above.

Answer: (b) rope drive.

79. In rotating electrical machines, the insulation temperature limit for class B type is

(a) 105°C

(b) 130°C

(c) 150°C

(d) 180°C

Answer: (b) 130°C

80. For a particular motor, the cooling time constant is usually

(a) smaller than the heating time constant.

(b) greater than the heating time constant.

(c) equal to the heating time constant.

Answer: (b) greater than the heating time constant.

81. For a particular type of motor, the heating time constant

(a) increases with the increase in size.

(b) decreases with the increase in size.

(c) same for all sizes.

Answer: (a) increases with the increase in size.

82. For estimation of power rating of an electric drive, its losses can be considered to be proportional to

(a) power.

(b) $(\text{power})^2$.

(c) $(\text{power})^3$.

(d) torque.

Answer: (b) $(\text{power})^2$.

83. The heating time constant of a totally enclosed motor is relatively

(a) lower.

(b) higher.

(c) independent of type of enclosure.

Answer: (b) higher.

84. For a certain industrial application, an overrated ac motor was selected. It will lead to operation with

(a) higher efficiency and better pf.

(b) lower efficiency and poorer pf.

(c) higher efficiency and poorer pf.

(d) lower efficiency and better pf.

Answer: (b) lower efficiency and poorer pf.

85. A flywheel is generally used in

(a) a cement mill drive.

(b) a paper mill drive.

(c) a roiling mill drive.

(d) a sugar centrifuge drive.

Answer: (c) a roiling mill drive.

86. In overhead travelling cranes

(a) continuous rating motors are used.

(b) continuous minimum rating motors are used.

(c) short-time rating motors are used.

(d) any of the above.

Answer: (c) short-time rating motors are used.

87. 15 minute rated motors are suitable for

(a) light duty cranes.

(b) medium duty cranes.

(c) heavy duty cranes.

(d) all of the above.

Answer: (a) light duty cranes.

88. For medium duty cranes the short-time rating motor used is

(a) 10 minutes.

(b) 15 minutes.

(c) 30 minutes.

(d) one hour.

Answer: (c) 30 minutes.

89. Load equalization is desirable in the case of

(a) very large refrigeration and air-conditioning plants.

(b) rolling mills, electric hammers, presses, reciprocating pumps.

(c) lathes, woodworking machines, paper making machines, shapers and slotters.

(d) travelling cranes, lifts.

Answer: (b) rolling mills, electric hammers, presses, reciprocating pumps.

90. The phase controlled rectifiers used in speed control of dc motors converts fixed ac supply voltage into……output voltage.

(a) variable dc

(b) variable ac

(c) variable frequency ac

(d) full rectified ac

Answer: (a) variable dc

91. A four quadrant operation requires

(a) two full converters in series.

(b) two full converters connected back to back.

(c) two full converters connected in parallel.

(d) two semi converters connected back to back.

Answer: (b) two full converters connected back to back.

92. The following converters can feed power in any of the four quadrants

(a) semi-converter.

(b) full converter.

(c) dual converter.

(d) combination of a semi and full-converters.

Answer: (c) dual converter.

93. For speed control of dc motors using controlled rectifiers, armature voltage control gives speed

(a) above rated speed.

(b) below rated speed.

(c) above as well as below rated speed.

Answer: (b) below rated speed.

94. Armature of a dc motor is fed from a phase controlled rectifier where as its field is supplied from a constant dc source. To reduce the speed of the motor regeneratively

(a) the firing angle of the converter should be increased.

(b) the polarity of the dc voltage should be reversed.

(c) the polarity of the armature induced voltage should be reversed.

(d) the firing angle should be varied in the range 90° to 80° simultaneously reversing the armature connections.

Answer: (a) the firing angle of the converter should be increased.

95. For the speed control of ac drive, the preferred method using thyristors is

(a) phase control.

(b) integral cycle control.

(c) chopper control.

(d) all are equally good.

Answer: (c) chopper control.

96. The semiconductor device used for speed control of single phase induction motors in every day domestic use is

(a) SCR.

(b) power transistor.

(c) Triac.

(d) power MOS.

Answer: (c) Triac.

97. Which of the following motor is suitable for driving cranes, hoists, centrifugal pumps, conveyor belt etc. ?

(a) DC series motor.

(b) DC shunt motor.

(c) DC compound wound motor.

(d) Any of the above.

Answer: (a) DC series motor.

98. Heavy-duty steel-works cranes having wide load variations are equipped with

(a) dc series motors.

(b) plain squirrel cage induction motors.

(c) wound rotor induction motors.

(d) synchronous motors.

Answer: (a) dc series motors.

99. The most suitable motor for a steel mill requiring a motor having high starting torque, wide speed range and precise speed control is

(a) plain squirrel cage induction motor.

(b) wound rotor induction motor.

(c) dc series motor.

(d) dc shunt motor.

Answer: (c) dc series motor.

100. For automatic drives the preference is for

(a) synchronous motors.

(b) Wald-Leonard controlled dc shunt motors.

(c) plain squirrel cage induction motors.

Answer: (b) Wald-Leonard controlled dc shunt motors.

101. The type of motor that can be used for hoisting machinery is

(a) dc compound motor.

(b) Ward-Leonard controlled dc shunt motor.

(c) wound rotor induction motor.

(d) any of the above.

Answer: (d) any of the above.

102. The motor normally used for crane travel is

(a) wound rotor induction motor.

(b) synchronous motor.

(c) dc differentially compounded motor.

(d) plain squirrel cage induction motor.

Answer: (d) plain squirrel cage induction motor.

103. The drive, that can be used for derricks and winches is

(a) pole-changing squirrel cage induction motor.

(b) ac slip-ring induction motor with variable resistance.

(c) dc shunt motor with Ward-Leonard control.

(d) any of the above.

Answer: (d) any of the above.

104. Ward-Leonard controlled dc drives are generally used for……..duty excavators.

(a) light

(b) medium

(c) heavy

(d) none of these.

Answer: (c) heavy

105. The motor suitable for a reciprocating pump required to start under load is

(a) plain squirrel cage induction motor.

(b) double-squirrel cage induction motor.

(c) synchronous motor.

(d) dc shunt motor.

Answer: (b) double-squirrel cage induction motor.

106. A pole-changing squirrel cage induction motor employed in derricks has four, eight and twenty four poles. The lowest speed is used in

(a) hoisting.

(b) landing the load.

(c) lifting.

(d) lowering.

Answer: (b) landing the load.

107. A pole-changing type squirrel cage induction motor employed in derricks has four, eight and twenty four poles. The medium speed is used in

(a) landing the load.

(b) hoisting.

(c) lowering.

(d) lifting.

Answer: (d) lifting.

108. Motor preferred for kiln drive is usually

(a) wound rotor induction motor.

(b) cascaded controlled ac motor.

(c) Ward-Leonard controlled dc shunt motor.

(d) any of the above.

Answer: (d) any of the above.

109. The motor used in mines is

(a) flame-proof squirrel cage induction or wound rotor motor.

(b) dc series motor.

(c) dc shunt motor.

(d) any of the above.

Answer: (a) flame-proof squirrel cage induction or wound rotor motor.

110. The motor used in punches, presses and shears is

(a) dc series or shunt motors.

(b) dc cumulative compound motor.

(c) high slip squirrel cage or wound rotor induction motor.

(d) both (b) and (c).

Answer: (d) both (b) and (c).

111. A domestic mixer uses the following motor

(a) induction motor.

(b) reluctance motor.

(c) universal motor.

(d) permanent magnet synchronous motor.

Answer: (c) universal motor.