

ASSISTANT EXECUTIVE ENGINEER (ELEC.)

QUESTIONS & ANSWERS

1. A ceiling fan uses

- A) split-phase motor
- B) capacitor start and capacitor run motor
- C) capacitor start motor
- D) universal motor

Ans: C

2. High frequency transformers sometimes make use of ferrite cores because it has

- A) High specific gravity
- B) low permeability
- C) High resistance
- D) High hysteresis

Ans: D

3. The percentage limiting error, in the case of an instrument reading of 8.3V with a 0 to 150V voltmeter having a guaranteed accuracy of 1% full-scale reading is

- A) 1.81%
- B) 0.181%
- C) 0.00%
- D) 18.1%

Ans: **D (revised)**

4. The frequency of the rotor current in a 3 phase 50 Hz, 4 pole induction motor at full load speed is about

- A) 50 Hz
- B) 2 Hz
- C) 20 Hz
- D) Zero

Ans: **B (revised)**

5. The relative speed between the magnetic fields of stator and rotor under steady state operation is zero for a

- A) dc machine
- B) Synchronous machine
- C) 3 phase induction machine
- D) Dc machine & Synchronous machine & 3 phase induction machine

Ans: D

6. Which of the following is not one of the three fundamental methods of firm valuation?

- A) Discounted Cash flow
- B) Income or earnings - where the firm is valued on some multiple of accounting income or earnings.
- C) Balance sheet - where the firm is valued in terms of its assets.
- D) Market Share

Ans: D

7. A byte represents a group of

- A) 8 bits
- B) 10 bits
- C) 24 bits
- D) 32 bits

Ans: A

8. A 1:5 stepup transformer has 120V across the primary and 600 ohms resistance across the secondary. Assuming 100% efficiency, the primary current equals

- A) 0.2 Amp
- B) 10 Amp
- C) 5 Amp
- D) 20 Amp

Ans: **C (revised)**

9. For a line voltage V and regulation of a transmission line R .

- A) $R \propto V$
- B) $R \propto 1$
- C) $R \propto 2V$
- D) $R \propto V$

Ans: **Question Nullified (revised)**

10. The introduction of interpoles in between the main pole improves the performance of d.c. machines, because

- A) A counter e.m.f. is induced in the coil undergoing commutation
- B) The flux waveform is improved with reduction in harmonic
- C) The inequality of air flux on the top and bottom halves of armature is removed
- D) The interpole produces additional flux to augment the developed torque

Ans: A

11. A 220/440 V, 50 Hz, 5 KVA, single phase transformer operates on 220V,40Hz supply with secondary winding open circuited. Then

- A) Both eddy current and hysteresis losses decreases
- B) Both eddy current and hysteresis losses increases
- C) Eddy current loss remains the same but hysteresis loss increases
- D) Eddy current loss increases but hysteresis loss remains the same

Ans: A

12. The speed of a d.c. shunt motor at no-load is

- A) 5 to 10%
- B) 15 to 20%
- C) 25 to 30%
- D) 35 to 40%

Ans: A

13. A computer virus is

- A) a hardware
- B) a computer program
- C) a client server
- D) a read-only memory

Ans: B

14. The maximum power for a given excitation in a synchronous motor is developed when the power angle is equal to

- A) 0 degree
- B) 60 degree
- C) 45 degree
- D) 90 degree

Ans: **D (revised)**

15. The drive motor used in a mixer-grinder is

- A) dc motor
- B) synchronous motor
- C) induction motor
- D) Universal motor

Ans: D

16. Out of the following methods of heating the one which is independent of supply frequency is

- A) electric arc heating
- B) induction heating
- C) electric resistance heating
- D) Dielectric heating

Ans: C

17. In moving coil meters, damping is provided by

- A) damping vane in the air tight chamber
- B) the aluminum frame of the coil
- C) eddy current disk
- D) the coil spring attached to the moving mechanism

Ans: B

18. The generation voltage is usually

- A) between 11 KV and 33 KV
- B) between 400 KV and 700 KV
- C) between 132 KV and 400 KV
- D) between 150KV and 500 KV

Ans: A

19. When a synchronous motor is running at synchronous speed, the damper winding produces

- A) damping torque
- B) torque aiding the developed torque
- C) eddy current torque
- D) no torque

Ans: D

20. The angle between the synchronous rotating stator flux and rotor poles of a synchronous motor is

- A) Synchronizing angle
- B) Torque angle
- C) Power factor angle
- D) Slip angle

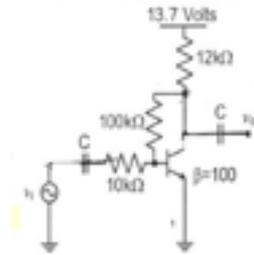
Ans: B

21. In a capacitor start single-phase induction motor, the capacitor is connected

- A) in series with main winding
- B) in series with auxiliary winding
- C) in series with both the windings
- D) in parallel with auxiliary winding

Ans: B

22. The voltage gain A_v of the circuit shown below is



- A) $|A_v| \approx 200$
- B) $|A_v| \approx 100$
- C) $|A_v| \approx 20$
- D) $|A_v| \approx 10$

Ans: D

23. The primary current in the current transformer is dictated by

- A) The secondary burden
- B) The core of the transforme
- C) The load current
- D) friction and windage losses

Ans: A

24. There are N men sitting around a circular table at N distinct points. Every possible pair of men except the ones sitting adjacent to each other sings a 2 minute song one pair after other. If the total time taken is 88 minutes, then what is the value of N?

- A) 8
- B) 9
- C) 10
- D) 11

Ans: A

25. A synchro has

- A) a 3-phase winding on stator and a single-phase winding on rotor
- B) a 3-phase winding on stator and a commutator winding on rotor
- C) a 3-phase winding on rotor and a single-phase winding on stator
- D) a single-phase winding on stator and a commutator winding on rotor

Ans: A

26. A single phase Hysteresis motor

- A) can run at synchronous and super synchronous speed
- B) can run at sub synchronous speed only
- C) can run at synchronous speed only
- D) can run at synchronous and sub synchronous speed

Ans: C

27. At constant temperature, pressure of a definite mass of gas is inversely proportional to the volume. If the pressure is reduced by 20%, find the respective change in volume.

- A) -16.66%
- B) 0.25
- C) -25%
- D) 0.1666

Ans: B

28. A commutator in a d.c. machine

- A) Reduces power loss in armature
- B) Reduces power loss in field circuit
- C) Converts the induced a.c armature voltage into direct voltage
- D) Its not necessary

Ans: C

29. 3000 is distributed among A, B and C such that A gets $\frac{2}{3}$ rd of what B and C together get and C gets $\frac{1}{2}$ of what A and B together get. Find C's share.

- A) Rs 750
- B) Rs 1000
- C) Rs 800
- D) Rs 1200

Ans: **B (revised)**

30. If the ratio of the ages of Mini and Tini is 5 : 6 at present, and fifteen years from now, the ratio will get changed to 8 : 9, then find Tini's present age.

- A) 24 years
- B) 30 years
- C) 18 years
- D) 33 years

Ans: B

31. No load current in a transformer

- A) lags the applied voltage by 90°
- B) leads the applied voltage by somewhat less than 90°
- C) leads the applied voltage by 90°
- D) lags the applied voltage by somewhat less than 90°

Ans: D

32. It is desired to convert a 0-1000A meter movement, with an internal resistance of 100 ohms, into a 0-100mA meter. The required value of shunt resistance is about

- A) 0.1 ohms
- B) 1 ohms
- C) 99 ohms
- D) 100 ohms

Ans: C

33. Two transformers operating in parallel will share the load depending upon their

- A) Rating
- B) Leakage reactance
- C) Efficiency
- D) Per-unit impedance

Ans: A

34. The full load copper loss of a transformer is 1600W. At half-load the copper loss will be

- A) 6400W
- B) 1600W
- C) 800W
- D) 400W

Ans: D

35. A two winding single phase transformer has a voltage regulation of 4.5% at full-load and unity power-factor. At full load and 0.80 power factor lagging load the voltage regulation will be

- A) 4.5%.
- B) more than 4.5%.
- C) less than 4.5%.
- D) 4.5% or more than 4.5%.

Ans: **B (revised)**

36. What is the default file extension for all MS Word documents

- A) .FIL
- B) .TXT
- C) .DOC
- D) .WRD

Ans: C

37. The National Sports Day is celebrated on which day in India?

- A) 28 August
- B) 29 August
- C) 30 August
- D) 27 August

Ans: B

38. The interior angles of a polygon are in AP. The smallest angle is 120° and the common difference is 5° . Find the number of sides of the polygon.

- A) 7
- B) 8
- C) 9
- D) 10

Ans: C

39. A 0 to 300V voltmeter has a guaranteed accuracy of 1% of full scale reading. The voltage measured by the instrument is 83V. The percentage limiting error is

- A) 95%
- B) 4.85%
- C) 3.62%
- D) 1.81%

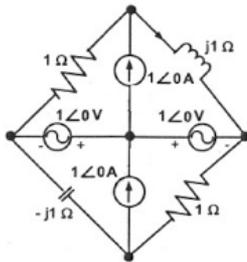
Ans: C

40. A toy is in the shape of a right circular cylinder with a hemisphere on one end and a cone on the other. The height and radius of the cylindrical part are 13 cm and 5 cm respectively. The radii of the hemispherical and conical parts are the same as that of the cylindrical part. Calculate the surface area of the toy if the height of conical part is 12 cm.

- A) 1440 cm²
- B) 385 cm²
- C) 1580 cm²
- D) 770 cm²

Ans: D

41. In the circuit given below, the current through the inductor is



- A) $(2/1+j)A$
- B) $(-1/1+j)A$
- C) $(1/1+j)A$
- D) 0A

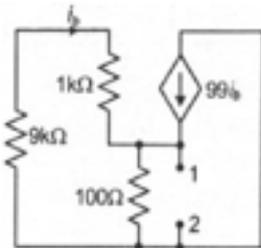
Ans: D

42. XYZ is an oil based business company, which does not have adequate working capital. It fails to meet its current obligation, which leads to bankruptcy. Identify the type of decision involved to prevent risk of bankruptcy.

- A) Investment decision
- B) Dividend decision
- C) Liquidity decision
- D) Policy decision

Ans: A

43. The impedance looking into nodes 1 and 2 in the given circuit is



- A) 50 Ω
- B) 100 Ω
- C) 5 k Ω
- D) 10.1 k Ω

Ans: A

44. In a d.c. machine, the armature mmf is

- A) rotating w.r.t. field
- B) stationary w.r.t. field
- C) stationary w.r.t. armature
- D) rotating w.r.t. brushes

Ans: A

45. Inverse definite minimum time lag relay is also called _____

- A) pilot relay.
- B) differential relay.
- C) over current relay.
- D) directional overcurrent relay.

Ans: B

46. At constant temperature, pressure of a definite mass of gas is inversely proportional to the volume. If the pressure is reduced by 20%, find the respective change in volume.

- A) -16.66%
- B) 25%
- C) -25%
- D) 16.66%

Ans: B

47. A high-pass π -connected symmetrical filter section has a capacitance of 5000 pF in its series arm and inductances of 500 μ H in each of its shunt arms. The cut-off frequency of the filter is

- A) 201.3 kHz
- B) 284.7 kHz
- C) 50.33 kHz
- D) 71.18 kHz

Ans: D

48. The stationary alternator should not be connected to live bus-bars because it

- A) Is likely to run as synchronous motor
- B) Will get short - circuit
- C) Will decrease bus - bar voltage though momentarily
- D) Will disturb generated emf's of other alternators connected in parallel

Ans: B

49. The maximum power in cylindrical and salient pole machines is obtained respectively at load angles of

- A) $90^\circ, 90^\circ$
- B) $<90^\circ, 90^\circ$
- C) $90^\circ, <90^\circ$
- D) $90^\circ, >90^\circ$

Ans: **C (revised)**

50. An alternator is delivering rated current at rated voltage and 0.8 power factor lagging case. If it is required to deliver rated current at rated voltage and 0.8 power-factor leading, the required excitation will be

- A) less.
- B) more or less.
- C) more.
- D) the same.

Ans: B

51. A salient pole synchronous motor is running at no load. Its field current is switched off. The motor will

- A) come to stop
- B) continue to run at synchronous speed
- C) continue to run at a speed slightly more than the synchronous speed
- D) continue to run at a speed slightly less than the synchronous speed

Ans: B

52. In a transformer the voltage regulation will be zero when it operates at

- A) unity p.f.
- B) lagging p.f
- C) leading p.f
- D) zero p.f. leading

Ans: **C (revised)**

53. The size of the feeder is determined primarily by

- A) the current it is required to carry
- B) the percent variation of voltage in the feeder
- C) the voltage across the feeder
- D) the distance of transmission

Ans: A

54. The two windings of a transformer is

- A) conductively linked
- B) not linked at all
- C) inductively linked
- D) electrically linked

Ans: **C (revised)**

55. What is the value of the firm usually based on?

- A) The value of debt and equity.
- B) The value of equity.
- C) The value of debt.
- D) The value of assets plus liabilities

Ans: B

56. The line trap unit employed in carrier current relaying:

- A) offers high impedance to 50 Hz power frequency signal
- B) offers high impedance to carrier frequency signal
- C) offers low impedance to carrier frequency signal
- D) offers high impedance to 50 Hz power frequency signal and high impedance to 50 Hz power frequency signal

Ans: B

57. a single throw of two dice, what is the probability that the sum is 9?

- A) 0.875
- B) 1/9
- C) 1/7
- D) 1/8

Ans: B

58. A low-pass T-connected symmetrical filter section has an inductance of 200mH in each of its series arms and a capacitance of 0.5 μ F in its shunt arm. The cut-off frequency of the filter is

- A) 1007 Hz
- B) 251.6 Hz
- C) 711.8 Hz
- D) 177.9 Hz

Ans: C

59. If a transformer primary is energised from a square wave voltage source, its output voltage will be

- A) A square wave
- B) A triangular wave
- C) A sine wave
- D) A pulse wave

Ans: **D (revised)**

60. The United Nations' (UN) International Day against Nuclear test is observed on which day?

- A) 28 August
- B) 29 August
- C) 30 August
- D) 27 August

Ans: B

61. A dishonest milkman mixed 1 litre of water for every 3 liters of milk and thus made up 36 liters of milk . If he now adds 15 liters of milk to the mixture, find the ratio of milk and water in the new mixture.

- A) 12:5
- B) 14:3
- C) 7:2
- D) 9:4

Ans: B

62. In a stepper motor the angular displacement

- A) can be precisely controlled
- B) it cannot be readily interfaced with micro computer based controller.
- C) the angular displacement cannot be precisely controlled
- D) it cannot be used for positioning of work tables and tools in NC machines.

Ans: A

63. A high-pass T-connected symmetrical filter section has capacitances of 400 nF in each of its series arms and an inductance of 200mH in its shunt arm. The cut-off frequency of the filter is

- A) 398 Hz
- B) 1125 Hz
- C) 281 H
- D) 1592 Hz

Ans: D

64. In a class with boys and girls a chess competition was played wherein every student had to play 1 game with every other student. It was observed that in 36 matches both the players were boys and in 66 matches both were girls. What is the number of matches in which 1 boy and 1 girl play against each other?

- A) 108
- B) 189
- C) 210
- D) 54

Ans: A

65. In a salient pole synchronous machine (usual symbols are used):

- A) $x_q > x_d$
- B) $x_q < x_d$
- C) $x_q = x_d$
- D) $x_q = 0$

Ans: **B (revised)**

66. A network designed to pass signals at frequencies below a specified cut-off frequency is called a

- A) band-stop filter
- B) high-pass filter
- C) band-pass filter
- D) low-pass filter

Ans: **D (revised)**

67. Which of the following devices is not a hardware device

- A) visual display unit
- B) Plotter
- C) Printer
- D) key board

Ans: A

68. In a synchronous motor, damper winding is provided to

- A) Stabilize rotor motion
- B) Suppress rotor oscillations
- C) Develop necessary starting torque
- D) Suppress rotor oscillations and Develop necessary starting torque

Ans: D

69. A balanced 3phase, 50 Hz voltage is applied to a 3 phase, 4 pole, induction motor. When the motor is delivering rated output, the slip is found to be 0.05. The speed of the rotor m.m.f. relative to the rotor structure is

- A) 1500 r.p.m
- B) 25 r.p.m.
- C) 1425 r.p.m
- D) 75 r.p.m

Ans: D

70. Squirrel cage bars placed in the rotor pole faces of an alternator help reduce hunting

- A) Above synchronous speed only
- B) Below synchronous speed only
- C) None of the other three
- D) Above and below synchronous speeds both

Ans: D

71. The principle of operation of a 3 phase induction motor is most similar to that of a

- A) Synchronous motor
- B) Repulsion start induction motor
- C) Transformer with a shorted secondary
- D) Capacitor start, induction run motor

Ans: C

72. Three men rent a farm for Rs. 7000 per annum. A puts 110 cows in the farm for 3 months, B puts 110 cows for 6 months and C puts 440 cows for 3 months. What percentage of the total expenditure should A pay?

- A) 20%
- B) 14.28%
- C) 16.66%
- D) 11.01%

Ans: B

73. In a d.c. series motor the electromagnetic torque developed is proportional to

- A) I_a
- B) I / I_a
- C) I_a^2
- D) I / I_a^2

Ans: **C (revised)**

74. A synchronous machine is called as doubly excited machine because

- A) It can be over excited
- B) It has two sets of rotor poles
- C) Both its rotor and stator are excite
- D) It needs twice the normal exciting current

Ans: C

75. The synchronous reactance of the synchronous machine is _____

- A) Ratio between short circuit voltage & open circuit current at different field
- B) Ratio between open circuit voltage & short circuit current at constant field current
- C) Ratio between open circuit voltage & short circuit current at different field current
- D) Ratio between open circuit voltage & short circuit current at constant field current

Ans: **D or B (revised)**

76. A cat takes 5 leaps for every 4 leaps of a dog, but 3 leaps of the dog are equal to 4 leaps of the cat. What is the ratio of the speed of the cat to that of the dog?

- A) 11:15
- B) 15:11
- C) 16:15
- D) 15:16

Ans: D

77. 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

78. The d.c. series motor should always be started with load because

- A) at no load, it will rotate at dangerously high speed
- B) it will fail to start
- C) it will not develop high starting torque
- D) all are true

Ans: A

79. A road that is 7 m wide surrounds a circular path whose circumference is 352 m. What will be the area of the road?

- A) 2618 cm²
- B) 654.5 cm²
- C) 1309 cm²
- D) 5236 cm²

Ans: A

80. In a three phase transformer, if the primary side is connected in star and secondary side is connected in delta, what is the angle difference between phase voltage in the two cases.

- A) delta side lags by -30°
- B) star side lags by -30°
- C) delta side leads by 30°
- D) star side leads by -30°

Ans: C

81. The low voltage winding of a 400/230 volt, 1-phase, 50Hz transformer is to be connected to a 25Hz supply in order to keep the magnetization current at the same level as that for normal 50Hz supply at 25Hz the voltage should be

- A) 230V
- B) 460V
- C) 115V
- D) 65V

Ans: C

82. The direction of rotation of a synchronous motor can be reversed by reversing

- A) Current to the field winding
- B) Supply phase sequence
- C) Polarity of rotor poles
- D) none of the other three

Ans: B

83. Harmonics in transformer result in

- A) Increased core losses
- B) Magnetic interference with communication circuits
- C) Increased I²R losses
- D) Increased core losses and I²R losses and also there is magnetic interference with communication circuits

Ans: C

84. A low-pass π -connected symmetrical filter section has an inductance of 200mH in its series arm and capacitances of 400 pF in each of its shunt arms. The cut-off frequency of the filter is

- A) 17.79 kHz
- B) 6.29 kHz
- C) 25.16 kHz
- D) 35.59 kHz

Ans: C

85. Which high-level committee has been constituted by the Union Government to promote card payments?

- A) Amit Mitra committee
- B) Shankar Acharya committee
- C) Ratan P Watal committee
- D) Arvind Subramanian committee

Ans: C

86. If the field of a synchronous motor is under excited, the power factor will be

- A) Lagging
- B) Leading
- C) Unity
- D) More than unity

Ans: A

87. The power factor of a squirrel cage induction motor is

- A) low at light load only.
- B) low at heavy load only.
- C) low at light and heavy load both.
- D) low at rated load only.

Ans: A

88. In a dc shunt motor the terminal voltage is halved while the torque is kept constant. The resulting approximate variation in speed ' ω ' and armature current ' I_a ' will be

- A) Both ω and I_a are doubled.
- B) ω is constant and I_a is doubled.
- C) ω is doubled while I_a is halved.
- D) ω is constant but I_a is halved.

Ans: B

89. The armature of a dc machine is laminated to reduce:

- A) Eddy current loss
- B) copper losses
- C) Hysteresis loss
- D) friction and windage losses

Ans: A

90. A synchronous motor connected to infinite busbars has at constant full-load, 100% excitation and unity pf. On changing the excitation only, the armature current will have

- A) Leading pf with under-excitation
- B) No change of pf
- C) Lagging pf with over excitation
- D) Leading pf with over excitation

Ans: D

91. In a 3 phase induction motor running at slip ' s ' the mechanical power developed In terms of air gap power P_g is

- A) $(s - 1)P_g$
- B) $(1 - s)P_g$
- C) $P_g(1-s)$
- D) $s * P_g$

Ans: **B or C (revised)**

92. Synchronous capacitor is

- A) An ordinary static capacitor bank
- B) An over excited synchronous motor driving mechanical load
- C) An over excited synchronous motor running without mechanical load
- D) Not an ordinary static capacitor bank or an over excited synchronous motor driving mechanical load or an over excited synchronous motor running without mechanical load

Ans: C

93. A transformer operates most efficiently at 3/4th full load. Its iron (P_I) and copper loss (P_{Cu}) are related as:

- A) $P_I / P_{Cu} = 16/9$
- B) $P_I / P_{Cu} = 4/3$
- C) $P_I / P_{Cu} = 3/4$
- D) $P_I // P_{Cu} = 9/16$

Ans: D

94. In a 3 – phase induction motor the maximum torque MC

- A) is proportional to rotor resistance r_2 .
- B) Does not depend on r_2
- C) Is proportional to
- D) is proportional to r_2

Ans: B

95. If a DC voltmeter is made from an ammeter having a full scale deflection of $100\mu\text{A}$ then its sensitivity (in $\text{K}\Omega/\text{V}$) will be

- A) 1
- B) 100
- C) 10
- D) 1000

Ans: **C (revised)**

96. 12 students can do a job in 10 days, but on the starting day, two of them informed that they are not coming. By what fraction will the number of days required for doing the whole work get increased?

- A) $4/5$
- B) $3/8$
- C) $3/4$
- D) $1/5$

Ans: D

97. The resistance representing mechanical output in the equivalent circuit of an induction motor as seen from the stator is:

- A) $r(1/s - 1)$
- B) $r_2(1/s - 1)$
- C) r/s
- D) r/s

Ans: A

98. An Ayrton shunt is used to make a D'Arsonval galvanometer into a

- A) single range voltmeter
- B) single range ammeter
- C) multi range ammeter
- D) multi range voltmeter

Ans: **C (revised)**

99. Three men rent a farm for Rs. 7000 per annum. A puts 110 cows in the farm for 3 months, B puts 110 cows for 6 months and C puts 440 cows for 3 months. What percentage of the total expenditure should A pay?

- A) 20%
- B) 14.28%
- C) 16.66%
- D) 11.01%

Ans: B

100. In DC generators, armature reaction is produced actually by

- A) Its field current
- B) Armature conductors
- C) Field pole winding
- D) Load current in armature

Ans: D