46/24

Question Booklet Alpha Code

A

Question Booklet Sl. No.

A

Total Number of Questions : 100 **Time : 90 Minutes**

Maximum Marks : 100

INSTRUCTIONS TO CANDIDATES

1. The Question Paper will be given in the form of a Question Booklet. There will be four versions of Question Booklets with Question Booklet Alpha Code viz. **A, B, C** & **D**.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the Question Booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a Question Booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your Question Booklet is un-numbered, please get it replaced by new Question Booklet with same alpha code.
6. The Question Booklet will be sealed at the middle of the right margin. Candidate should not open the Question Booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the Question Booklet supplied to him/her contains all the 100 questions in serial order. The Question Booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the Question Booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices **(A), (B), (C)** and **(D)** having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

A

1. Which of the following statement/s is/are correct regarding electric charge ?
   i. Charge is equal to current multiplied by time.
   ii. The charge of an electron is equal to 1.602×10^{-19} C.
   iii. Charge is equal to current divided by time.
   A) Only i and ii
   B) Only ii
   C) Only i
   D) Only ii and iii

2. Which of the following statement/s is/are correct regarding soldering ?
   i. The main constituent elements of solder alloy are tin and lead.
   ii. Silver based solders are used to carry out soldering at high temperature.
   iii. Flux cannot remove dirt or grease but removes the oxide layer.
   A) Only i and ii
   B) Only ii and iii
   C) Only i
   D) i, ii and iii

3. A nichrome wire of 10 cm length and 2 mm diameter has 2 Ω resistance. What is the resistance if 30 cm of the same wire is used, assuming temperature to be constant ?
   A) 6 Ω
   B) 2 Ω
   C) 3 Ω
   D) 12 Ω

4. Which of the following is/are unit/s of voltage ?
   i. Volt
   ii. Weber/sec
   iii. Weber/m^2
   A) Only i and iii
   B) Only i and ii
   C) Only i
   D) i, ii and iii

5. Which of the following is/are reason/s for widely using copper as conductor than silver ?
   i. Copper has more conductivity than silver.
   ii. Copper is cheaper than silver.
   A) Only i
   B) Only ii
   C) Both i and ii
   D) None of these

6. Which of the following is/are desirable characteristic/s of insulation materials ?
   i. High dielectric strength
   ii. Low dielectric strength
   iii. Flexible
   A) Only ii
   B) Only i
   C) Only i and iii
   D) Only ii and iii

7. Which of the following is/are correct regarding semiconductors ?
   i. Semiconductors have positive temperature coefficient of resistance.
   ii. Silicon, germanium and carbon are examples of semiconductor material.
   iii. Valence electrons of semiconductor materials are normally 4.
   A) Only ii
   B) Only i and iii
   C) Only iii
   D) Only ii and iii

8. Which of the following is/are correct regarding resistivity ?
   i. The unit of resistivity is Siemens per metre.
   ii. Resistivity does not depend on the size of conductor.
   A) Only i
   B) Only ii
   C) Both i and ii
   D) None of the above

9. If a 16 SWG wire has a cross sectional area of 2 mm^2 with a current capacity of 5A, then which of the following statement is true ?
   A) An 18 SWG wire has a cross sectional area of 1 mm^2 with a current rating of 2.3A
   B) An 18 SWG wire has a cross sectional area of 4 mm^2 with a current rating of 8.5A
   C) An 18 SWG wire has a cross sectional area of 4 mm^2 with a current rating of 2.3A
   D) An 18 SWG wire has a cross sectional area of 1 mm^2 with a current rating of 8.5A

10. Which of the following factors decide the insulation thickness of an electrical cable ?
   A) Current
   B) Power factor
   C) Both A) and B)
   D) Voltage

11. A 12V source with an internal resistance of 1Ω is connected across a load of 5Ω. Calculate the current through the load.
   A) 2.4A
   B) 2A
   C) 3A
   D) 12A

12. Which of the following statement/s is/are correct regarding Kirchoff's law ?
   i. Kirchoff's current law is applicable for closed loops.
   ii. Kirchoff's current law is applicable for junctions or nodes.
   iii. Kirchoff's voltage law is applicable for closed loops.
   iv. Kirchoff's voltage law is applicable for junctions or nodes.
   A) Only ii and iii
   B) Only ii and iv
   C) Only i and iii
   D) Only i and iv

13. Which of the following effects of electric current is utilized for electroplating ?
    A) Special rays effect
    B) Gas ionization effect
    C) Magnetic effect
    D) Chemical effect

14. Which of the following statement/s is/are correct regarding series and parallel connection of resistance ?
    i. The effective resistance of parallel combination of resistance is smaller than the smallest resistance in the combination.
    ii. The effective resistance of parallel combination of resistance is larger than the smallest resistance in the combination.
    iii. The effective resistance of series combination of resistance is larger than the largest resistance in the combination.
    iv. The effective resistance of series combination of resistance is smaller than the largest resistance in the combination.
    A) Only ii and iii
    B) Only i and iii
    C) Only i and iv
    D) Only ii and iv

15. Which of the following is/are correct regarding Ohm's law ?
    i. It is applicable when the temperature and other physical conditions do not change.
    ii. It is not applicable to non linear devices like Zener diode.
    A) Only i
    B) Only ii
    C) Both i and ii
    D) None of these

16. Which of the following properties are correct regarding resistance ?
    i. When temperature increases, resistance of pure metals increases normally.
    ii. When temperature increases, resistance of insulating materials decreases normally.
    iii. Certain alloys such as constantan shows practically no change in resistance for considerable temperature variation.
    A) Only i and ii
    B) Only i
    C) Only ii
    D) i, ii and iii

17. Which of the following is/are correct regarding electrochemical cells ?
    i. Wet type cells can be operated in both upright and horizontal position.
    ii. Voltaic cell is an example of primary cell.
    iii. Lead acid battery is an example of secondary cell.
    A) Only ii and iii
    B) Only i and iii
    C) Only iii
    D) i, ii and iii

18. Match the following electrochemical cells with their electrolytes.

1. Carbon Zinc cell	i. Ammonium chloride
2. Mercury cell	ii. Sulphuric acid
3. Lead acid battery	iii. Potassium Hydroxide

A) 1 – i, 2 – ii, 3 – iii
B) 1 – ii, 2 – i, 3 – iii
C) 1 – i, 2 – iii, 3 – ii
D) 1 – iii, 2 – i, 3 – ii

19. 4 numbers of 12 V, 80 Ah batteries are connected in series. Another 4 numbers of series connected 12 V, 80 Ah batteries are connected parallel to the first set of series connected batteries. What is the effective voltage and Ampere hour rating of the arrangement ?

A) 48 V, 80 Ah
B) 48 V, 160 Ah
C) 24 V, 80 Ah
D) 24 V, 320 Ah

20. Which of the following statement/s is/are correct regarding maintenance of lead acid battery ?

i. Do not overcharge or discharge the battery at high rates as it might cause buckling.
ii. The level of electrolyte should be kept below the plate level.

A) Only i
B) Only ii
C) Both i and ii
D) None of these

21. Which of the following statement/s is/are correct regarding magnetic materials ?

i. Ferromagnetic substances are strongly attracted by a magnet.
ii. Paramagnetic substances are slightly repelled by a magnet.
iii. Diamagnetic substances are slightly attracted by a magnet.

A) Only i and ii
B) Only i and iii
C) Only i
D) i, ii and iii

22. Match the following magnetic materials and their examples :

1. Ferromagnetic material	i. Iron
2. Paramagnetic material	ii. Aluminium
3. Diamagnetic material	iii. Bismuth

A) 1 – i, 2 – ii, 3 – iii
B) 1 – ii, 2 – i, 3 – iii
C) 1 – i, 2 – iii, 3 – ii
D) 1 – ii, 2 – iii, 3 – i

23. Which of the following statement/s is/are correct regarding magnetic effect of electric current ?

i. Greater the current through the conductor, the stronger is the magnetic field produced.
ii. Right hand grip rule can be used to determine the direction of magnetic field around a conductor.
iii. Magnetic field near the conductor is weak and becomes stronger as the distance from conductor increases.

A) Only i and iii
B) Only i and ii
C) Only i
D) i, ii and iii

24. Which of the following is/are unit/s of magnetic flux density ?
    A) Weber per metre square
    B) Weber
    C) Tesla
    D) Both A) and C)

25. Which of the following statement/s is/are correct regarding Fleming's rule ?
    i. Fleming's Right Hand rule is used to determine direction of induced EMF.
    ii. Fleming's Right Hand rule is used to determine the direction of the force acting on the current carrying conductor placed in a magnetic field.
    iii. Fleming's Left Hand rule is used to determine direction of induced EMF.
    iv. Fleming's Left Hand rule is used to determine the direction of the force acting on the current carrying conductor placed in a magnetic field.
    A) Only i and iv
    B) Only i and iii
    C) Only ii and iv
    D) Only ii and iii

26. Which of the following statement/s is/are correct regarding reluctance ?
    i. Magnetic materials like iron have high reluctance.
    ii. Non-magnetic materials have high reluctance.
    iii. The reciprocal of reluctance is known as permeance.
    A) Only i and iii
    B) Only i
    C) Only ii and iii
    D) Only ii

27. Which of the following is/are correct regarding Faraday's laws of electromagnetic induction ?
    i. EMF is induced in a conductor when there is a relative motion between conductor and magnetic field.
    ii. EMF is induced in a conductor when it moves in a direction parallel to the conductor.
    iii. EMF is induced in a conductor when it lies in a magnetic field.
    A) Only ii and iii
    B) Only i
    C) Only i and iii
    D) i, ii and iii

28. Which of the following factors affect the current through a capacitor ?
    i. The frequency of applied voltage.
    ii. The capacitance of the capacitor.
    iii. The amplitude of the applied voltage.
    A) Only i and ii
    B) Only iii
    C) Only ii and iii
    D) i, ii and iii

29. Which of the following capacitors cannot be used in AC circuits ?
    A) Electrolytic capacitor
    B) Mica capacitor
    C) Paper capacitor
    D) Both B) and C)

30. What is the capacitance of a capacitor that requires 1 mC to charge it to 50 V ?
    A) 50 μF
    B) 20 μF
    C) 20 mF
    D) 50 mF

31. What is the working principle of earth resistance tester ?
    A) Faraday's laws of electrolysis
    B) Fall of potential method
    C) Fleming's right hand rule
    D) Wheatstone bridge

32. The instrument used to measure insulation resistance of a wiring installation
    A) Ohm meter
    B) Multimeter
    C) Megger
    D) Wheatstone bridge

33. In which wiring installation the system earthing is to be done ?
    A) Generating stations and substations
    B) Domestic wiring
    C) Industrial wiring
    D) Tunnel wiring

34. What is the minimum size of copper plate used in plate earthing ?
    A) 600 mm × 600 mm × 3.15 mm
    B) 300 mm × 300 mm × 3.15 mm
    C) 600 mm × 600 mm × 6.28 mm
    D) 300 mm × 300 mm × 6.28 mm

35. What type of lamp holder is commonly used in studios, flood lights and head lights for lamps over 300 watts ?
    A) Edison screw type holder
    B) Goliath Edison screw type holder
    C) Bayonet cap
    D) Pendent lamp holder

36. What is the minimum value of insulation resistance of any wiring installation ?
    A) 1 Ω
    B) 1K Ω
    C) 1M Ω
    D) 10M Ω

37. As per IE rules the maximum load in a power sub circuit is limited to
    A) 1000 watts
    B) 2000 watts
    C) 3000 watts
    D) 5000 watts

38. What is the maximum leakage current in an installation as per IE rules ?
    A) 1/500 of full load current
    B) 1/5000 of full load current
    C) 1/50000 of full load current
    D) 1/50 of full load current

39. What type of circuit breaker is typically used for current ratings above 100 Ampere up to 800 Ampere ?
    A) MCB
    B) ELCB
    C) MCCB
    D) RCCB

40. The minimum area of cross section of copper conductor in power wiring is
    A) 1.5 sq. mm
    B) 2.5 sq. mm
    C) 3.5 sq. mm
    D) 4 sq. mm

41. The direction of emf induced in a DC generator can be find out by which of the following rule ?
    A) Fleming's left hand rule
    B) Right hand grip rule
    C) Right hand palm rule
    D) Fleming's right hand rule

42. What is the working principle of a DC generator ?
    A) Faraday's laws of electrolysis
    B) Fleming's left hand rule
    C) Fleming's right hand rule
    D) Faraday's laws of electromagnetic induction

43. Calculate the emf generated in a 6 pole lap wound DC generator which has 1000 conductors driven at a speed of 1500 rpm, the flux per pole is 3 milliweber.
    A) 75 Volts
    B) 150 Volts
    C) 225 Volts
    D) 240 Volts

44. How many parallel paths in duplex wave winding of an eight pole DC generator ?
    A) 2
    B) 4
    C) 6
    D) 8

45. What is the function of split rings of a DC generator ?
    A) To increase the output voltage
    B) To reduce copper loss
    C) To increase the efficiency
    D) To ensure constant emf direction

46. The purpose of laminating armature of a DC generator is to
    A) Reduce hysteresis loss
    B) Increase efficiency
    C) Reduce fluctuations in load
    D) Reduce eddy current loss

47. To reverse the direction of rotation of a compound motor without changing its characteristics is to change the direction of current of
    A) Armature
    B) Shunt field
    C) Series field
    D) Both shunt field and armature

48. Which speed control method offers below normal speed in DC shunt motor ?
    A) Field control method
    B) Armature control method
    C) Voltage control method
    D) Ward Leonard speed control

49. The connection of hold on coil in a three point starter of a DC shunt motor is
    A) In series with armature
    B) In series with shunt field
    C) In parallel with armature
    D) In parallel with supply

50. Which speed control method is applied to obtain both below and above normal speed in a DC motor ?
    A) Armature control method
    B) Field control method
    C) Ward Leonard speed control
    D) Tapped field control

51. The displacement of starting and running windings of single phase induction motor is _____ degree electrical.
    A) 45
    B) 90
    C) 120
    D) 180

52. Universal motor is not suitable for the following application
    A) Vacuum cleaner
    B) Food mixer
    C) Portable drilling machine
    D) Domestic pump motor

53. The rotor of a squirrel cage induction motor is short circuited by using
    A) Shading rings
    B) End rings
    C) Compensating windings
    D) None of these

54. What is the speed of stator rotating magnetic field of 3 phase squirrel cage induction motor ?
    A) Rotor speed
    B) Slip speed
    C) Synchronous speed
    D) Slightly less than synchronous speed

55. The number of contactors in an automatic star delta starter is
    A) 1
    B) 2
    C) 3
    D) 4

56. _____ starter does not reduces starting current.
    A) Direct on line
    B) Star delta
    C) Auto-transformer
    D) Rotor resistance

57. Slip ring induction motor is started by using _____ starter.
    A) Direct on line
    B) Star delta
    C) Rotor resistance
    D) All the above

58. The function of ferrule in panel board is to identify
    A) Panel
    B) Cable
    C) Earth
    D) Switch

59. The accessory used to hold and insulate the cable while passing through drilled holes in a panel is
A) Wire clip
B) Sleeve
C) Thimble
D) Grommet

60. The direction of rotation of a three phase squirrel cage induction motor is reversed by
A) Cascade control
B) Changing applied frequency
C) Interchanging any two phases
D) All the above methods

61. Watt meter is a/an _____ instrument.
A) Indicating
B) Integrating
C) Recording
D) None of these

62. Which effect of electric current is utilised in moving iron type instrument to produce deflecting torque ?
A) Heating
B) Magnetic
C) Chemical
D) Ionisation

63. The material used for making springs in spring controlled instruments must have
A) Low specific resistance
B) Non-magnetic
C) Low temp. coefficient of resistance
D) All the above

64. The torque required in an indicating instrument to bring the pointer quickly to rest in its deflected position to obtain quick and accurate reading is
A) Deflecting torque
B) Controlling torque
C) Damping torque
D) None of these

65. _____ type instrument measures AC quantities only.
A) Moving coil
B) Moving iron
C) Dynamometer
D) Induction

66. What is the working principle of two winding transformer ?
A) Self induction
B) Mutual induction
C) Electromagnetic drag
D) Conduction

67. In a transformer, which factor remains the same when transformer action takes place ?
A) Current
B) Voltage
C) Frequency
D) Temperature

68. Which of the following statement is false about a transformer ?
    A) The per turn induced emf of primary and secondary are different
    B) The magnitude of induced emf is directly proportional to number of turns in the respective winding
    C) The magnitude of induced emf is directly proportional to supply frequency
    D) Transformation ratio of step up transformer is greater than one

69. In order to operate two single phase transformers in parallel which factor/factors must be kept same ?
    A) Polarity
    B) Voltage ratios
    C) Percentage impedance
    D) All the above

70. Transformer oil is filled in the transformer tank for
    A) Cooling the windings
    B) Insulating the windings
    C) Cooling and insulating the windings
    D) Preventing moisture entry into the tank

71. The unit of lamp efficiency is
    A) Lumen second
    B) Lumen
    C) Lumen per watt
    D) Lux

72. If the distance between the surface and the light source is doubled, illumination of the surface becomes
    A) Double
    B) Quadruple
    C) Half
    D) One fourth

73. The function of choke in fluorescent tube light is
    A) Surge voltage and limit current
    B) High voltage and increase current
    C) Low voltage and limit current
    D) Low voltage and increase the current

74. The mercury vapour lamp gives
    A) Red-orange glow
    B) Greenish blue light
    C) Yellow light
    D) White light

75. The sweep of the ceiling fan is determined by
    A) Speed of the fan
    B) Mounting height of fan
    C) Diameter of the circle formed by the blade tip of fan
    D) All of these

76. The knee voltage of a silicon diode is
A) 0.2 B) 0.3
C) 0.5 D) 0.7

77. Doping element of N-type semiconductor is
A) Aluminium B) Gallium
C) Antimony D) Indium

78. The ripple factor of a single phase full wave bridge rectifier is
A) 0.482 B) 0.812
C) 1.11 D) 1.21

79. The emitter of a transistor is _____ doped.
A) Heavily B) Moderately
C) Lightly D) None of these

80. In a full wave bridge rectifier, the current in each diodes flows for
A) The complete cycle of the input signal B) Half cycle of the input cycle
C) More than half cycle of the input signal D) None of these

81. Identify the non-renewable resource from the following.
A) Solar B) Natural gas
C) Geothermal D) Hydro

82. Solar cells are made of
A) Aluminum B) Germanium
C) Silicon D) Cadmium

83. Fuel used in nuclear reactors are
A) Co-60 B) U-235
C) I-131 D) U-238

84. The power generation in a windmill depends on
A) Wind velocity B) Height of tower
C) Thickness of blade D) Shape of blade

85. The principle on which solar cell works
A) Opto coupling B) Isolation
C) Photovoltaic D) Black body radiation

86. The use of economizer in thermal power plant is
    A) Heat up feed water
    B) Heat up the fuel
    C) Cool the pulverized fuel
    D) Heat up incoming air

87. In hydro-electric power plant, the surge tank is used to
    A) Supply water at constant pressure
    B) Relieve water hammer pressure in penstock pipe
    C) Produce surge in the pipeline
    D) None of these

88. What is the approximate efficiency of a typical thermal power station ?
    A) 26 – 36%
    B) 45 – 55%
    C) 55 – 65%
    D) 65 – 75%

89. The graphical representation of the discharge and time is known as
    A) Load curve
    B) Monograph
    C) Hector graph
    D) Hydro graph

90. For high head low discharge hydel power plant the water turbine used is
    A) Pelton wheel
    B) Fransis turbine
    C) Propeller turbine
    D) Kaplan turbine

91. The copper loss in transformer can be reduced by
    A) Changing the core materials
    B) Laminating the core
    C) Reducing the resistance of the winding
    D) All of the above

92. Guy wire is employed for
    A) Providing protection against surges
    B) Supporting the pole
    C) Providing emergency earth route
    D) None of the above

93. The highest transmission voltage used in India is
    A) 132 kV
    B) 220 kV
    C) 440 kV
    D) 765 kV

94. The length of short transmission line is up to
    A) 50 km
    B) 100 km
    C) 120 km
    D) 200 km

95. If the length of a single core underground cable is doubled, its capacitance becomes
    A) Doubled
    B) Halved
    C) Quadrupled
    D) No change

96. Skin effect in an AC transmission system depends on which of the following ?
    i. Nature of material
    ii. Diameter of wire
    iii. Frequency
    iv. Shape of wire
    A) i, iii
    B) i, ii, iii
    C) i, iii, iv
    D) i, ii, iii, iv

97. Back to back DC link is used to connect
    A) Long distance DC transmission line
    B) Transmit large block of relatively cheap power from remote source
    C) Couple two AC system at different frequencies
    D) None of the above

98. The DC ring main distribution system is used because of
    A) Good voltage regulation
    B) More reliable than others
    C) Both A) and B)
    D) None of the above

99. The neutral current of balanced 3 phase 4 wire system is
    A) Zero
    B) Increase with load
    C) Decreases with load
    D) None of the above

100. Which of the following is not an advantage of a DC transmission line ?
    A) Low corona loss and radio interference
    B) Greater reliability
    C) Require high reactive power to transmit over DC line
    D) None of the above

Space for Rough Work