110/2022

Maximum : 100 marks

Time : 1 hour and 30 minutes

1. Which of the following statement is/are correct about an atom?

(i) The electrons have a negative charge of 1.602×10^{-19} Coulomb.

(ii) The nucleus of atom consists of protons and neutrons.

(iii) The protons have a positive charge of 1.602×10^{-19} Coulomb.

(A) (i) only
(B) (i) and (ii) only
(C) (ii) and (iii) only
(D) All of the above (i), (ii) and (iii)

2. The Valence shell of an atom of a material is filled with four electrons. The material is known as :

(A) Semiconductors
(B) Conductors
(C) Insulators
(D) Super conductors

3. Which of the following process is known as Soldering?

(i) The process of joining two metal conductors without melting them.

(ii) The process of joining two metal conductors by melting them.

(iii) The process of joining two metal conductors by using the rivets.

(A) (i) and (ii) only
(B) (iii) only
(C) (i) only
(D) (ii) only

4. Which of the following soldering flux is used for soldering electrical conductors?

(A) Sodium carbonate
(B) Borax
(C) Tallow
(D) Sodium Chloride

5. Which of the following is/are the commonly available soldering flux used for soldering Aluminium conductors?

(i) ALCAP

(ii) Ker-al-lite

(iii) Kynal flux

(iv) Eyre No. 7

(A) (i) and (ii) only
(B) (iii) and (iv) only
(C) (ii) and (iii) only
(D) None of the above

6. Which of the following method is/are used for laying underground (UG) cable?

(i) Laying direct in ground or in ducts

(ii) Laying in racks in air or in tunnel

(iii) Laying along buildings or structures

(A) (i) and (ii) only

(B) None of the above

(C) (ii) and (iii) only

(D) All of the above (i), (ii) and (iii)

7. When the operating voltages are greater than 66 KV, which type of the following cable is/are used for electric power transmission?

(A) SL type cable

(B) Pressure cable

(C) Screened cable

(D) Belted cable

8. Which of the following substance is/are known as semiconductors?

(i) Germanium

(ii) Eureka

(iii) Ebonite

(iv) Silicon

(A) (i) and (iv) only

(B) (ii) and (iv) only

(C) (ii) and (iii) only

(D) All of the above (i), (ii) and (iii)

9. Which of the following statement is/are true about UG cables?

(i) Armoring protect the cable from mechanical injuries.

(ii) Metallic sheath protect the cable from chemical attacks.

(iii) Bedding protects the armoring from corrosion.

(A) (i) and (ii) only

(B) (i) and (iii) only

(C) (ii) and (iii) only

(D) All of the above (i), (ii) and (iii)

10. Which of the following wire joint is used in OH lines for tapping the electric supply perpendicular to the service lines?

(A) Pigtail joint

(B) Britannia tee joint

(C) Married joint

(D) Western union joint

11. Which of the following law states that the resistance of a wire is directly proportional to its length and inversely proportional to its area of cross section at constant resistivity of the material of the wire?

(A) Ohms Law
(B) Kirchhoff's First Law
(C) Kirchhoff's Second Law
(D) Laws of Resistance

12. What will be the current flowing through each resistors when a 100 Ω and 50 Ω resistors are connected in series across a 300 V DC supply?

(A) 2 A flowing through both resistors
(B) 0.5 A flowing through both resistors
(C) 3 A through 100 Ω and 6 A through 50 Ω
(D) 9 A through both resistors

13. Which of the following statement is/are correct about Kirchhoff's Laws?

(i) The sum of incoming current at a junction is equal to the sum of outgoing current from that junction.
(ii) The sum of voltage drops in a closed circuit is equal to the voltage applied to the circuit.
(iii) Current flowing through a closed resistive circuit is always equal to the voltage applied to the circuit.

(A) (i) and (iii) only
(B) (ii) and (iii) only
(C) (i) and (ii) only
(D) All of the above

14. Which of the following statement is/are correct about resistance of pure metallic conductors?

(i) Resistance increases with the increase in temperature.
(ii) Resistance decreases with the decrease in temperature.
(iii) Resistance decreases with the increase in area of cross section.
(iv) Resistance increases with the increase in area of cross section.

(A) All of the above
(B) (i) and (iii) only
(C) (ii) and (iv) only
(D) (ii) and (iii) only

15. If ten numbers of 200 ohm resistors are connected in parallel across a 12 V dc supply. What will be the effective resistance appeared across the supply?

(A) 2000 Ohm
(B) 166.6 Ohm
(C) 16.6 Ohm
(D) 20 Ohm

16. The mass of a substance liberated or deposited during electrolysis by one coulomb of electricity is termed as :

(A) Electro motive equivalent
(B) Electro voltaic equivalent
(C) Electro chemical equivalent
(D) Electrolytic equivalent

17. Which of the following statement is/are correct about a Dry cell?

(i) The chemical reaction between the electrodes and the electrolyte produces a voltage.
(ii) The dry cells must not be always operated in an upright position.
(iii) The cells have vents to escape gases generated during charge/discharge.

(A) (i) and (ii) only
(B) (i) and (iii) only
(C) (ii) and (iii) only
(D) All of the above (i), (ii) and (iii)

18. The bending of electrodes in a lead acid cell due to overcharging is known as :

(A) Polarization
(B) Plante Plate
(C) Faure plate
(D) Buckling

19. Which of the following Cell in which the chemical reaction that occurs during discharge is not reversed?

(A) Lead acid cell
(B) Nickel-iron cell
(C) Carbon-zinc cell
(D) None of the above

20. A battery operated electric bike requires 48 V, 100 Ah battery pack. The cell rated 1.2 V, 2 Ah is available. Choose a suitable combination from the following to make the battery pack :

(A) 40 parallel rows with 50 cells in series
(B) 50 parallel rows with 40 cells in series
(C) 100 parallel rows with 40 cells in series
(D) 40 parallel rows

21. What is the capacitance of a capacitor if 10 V is applied to it and store a charge of 10 Coulomb?

(A) 1 Farad
(B) 1 Micro Farad
(C) 1 Nano Farad
(D) 100 Farad

22. Which of the following statement is/are correct about the Capacitive reactance?

(i) The opposition offered to the flow of alternating current by a capacitor.

(ii) Capacitive reactance is inversely proportional to the frequency of supply voltage.

(iii) Capacitive reactance is directly proportional to the capacitance of the capacitor.

(A) (i) and (ii) only

(B) (i) and (iii) only

(C) All of the above (i), (ii) and (iii)

(D) (iii) only

23. Which of the following is a polarized capacitor?

(A) Mica capacitor (B) Ceramic capacitor

(C) Tantalum capacitor (D) None of the above

24. A circuit consists of two capacitors of 10 micro farad each are connected in series across a 20 V supply. How much charge is stored in the circuit?

(A) 200 micro coulomb (B) 100 micro coulomb

(C) 2 micro coulomb (D) 2 Coulomb

25. Which of the following law states that the back EMF has a polarity, which opposes the force that created it?

(A) Lenz's Law (B) Fleming's Law

(C) Faraday's Law (D) None of the above

26. An inductor of 1 Henry is connected to a 100 V, 50 Hz, AC supply. What is the value of reactance that offered by the inductor?

(A) 3.14 Ω (B) 314 KΩ

(C) 314 Ω (D) 100 Ω

27. Which of the following expression gives the amount of energy stored in an Inductor?

(A) $2\ LI^2$ (B) $0.5\ LI^2$

(C) $2\ L^2I$ (D) $0.5\ L^2I$

28. Which of the following factor determines the polarity of the electromagnet?

(A) Magnitude of Voltage (B) Magnitude of current

(C) Strength of Magnetic flux (D) Direction of Current

29. Which of the following material is a Paramagnetic material?

(A) Iron (B) Bismuth

(C) Aluminium (D) Nickel

30. Which of the following rule is used to determine the direction of mechanical force experienced by a current carrying conductor placed in a magnetic field?

(A) Fleming's left hand rule

(B) Cork screw rule

(C) Helix rule

(D) None of the above

31. Which of the following statements, is not necessarily valid for alternating current?

(A) interferes with communication lines

(B) develops eddy current losses

(C) is suitable for charging batteries

(D) provide better safety as compared to direct current

32. In ac circuit, from the following elements the power consumed in :

(i) Inductance

(ii) Capacitance

(iii) Resistance

(A) Both (i) and (ii) (B) (ii) only

(C) (i) only (D) (iii) only

33. The insulating material of the cable should have :

(A) low permittivity

(B) high resistivity

(C) high dielectric strength

(D) all of the above

34. If the supply frequency changes from 50 Hz to 100 Hz. keeping the voltage constant, the current flowing through the coil, having negligible resistance and high inductive reactance :

(A) remain same (B) become half

(C) become doubled (D) become 4 times

35. Choose the most suitable answer from the following statement, to improve the power factor of a system.

(i) use only the resistive load

(ii) run the motor with the full load

(iii) use capacitive bank

(iv) all of the above

(A) both (i) and (ii)

(B) (iv) only

(C) both (ii) and (iii)

(D) (iii) only

36. Why AC is required to measure the earth resistance by using earth resistance tester?

(A) Avoid electrolytic emf interference

(B) Increase the voltage drop

(C) Decrease the voltage drop

(D) Regulate the current

37. Which type of wiring system is suitable for multistoried building?

(A) Tree system

(B) Ring main system

(C) Distribution board system

(D) Looping out with junction box

38. What is the permissible leakage current in any wiring installation as per IE rule?

(A) Not exceed $1/50^{th}$ part of full load current

(B) Not exceed $1/500^{th}$ part of full load current

(C) Not exceed $1/5000^{th}$ part of full load current

(D) Not exceed $1/50000^{th}$ part of full load current

39. Which type test is to be carried out to check whether the switches are connected in live wire or not?

(A) Ground test

(B) Polarity test

(C) Insulation resistance test

(D) Continuity test

40. Which is the minimum clearance between the bottom point of the ceiling fan and the floor as per IE Rule?

(A) 1.2 m

(B) 1.8 m

(C) 2.4 m

(D) 3.2 m

41. What will happen, if shunt field resistance is too large?

(A) Fails to build up voltage
(B) Build up voltage
(C) Generator doesn't run
(D) Voltage increases

42. How load is shifted from one generator to other when DC generators are operating in parallel?

(A) Adjusting speed
(B) Adjusting armature resistance
(C) By stopping the generator
(D) Adjusting excitation

43. Which of the following generator does not build up voltage if load is not connected?

(A) Series generator
(B) Shunt generator
(C) Long shunt compound generator
(D) Short shunt compound generator

44. Which motor is used in heavy construction trucks?

(A) Differential compound motor
(B) Cumulative compound motor
(C) DC shunt motor
(D) DC series motor

45. Why the holding coil of a 3 point starter is connected in series with shunt field?

(A) To limit the load current
(B) To protect the motor from high speed
(C) To hold the handle plunger firmly
(D) To run motor at low voltage

46. Which type of DC generator is used for long distance distribution lines?

(A) Shunt generator
(B) Series generator
(C) Differential compound generator
(D) Cumulative compound generator

47. Which speed control methods offers below normal speed in DC shunt motor?

(A) Field control method
(B) Voltage control method
(C) Armature control method
(D) Ward Leonard system of speed control

48. How to obtain opposite polarity in adjacent poles of a 4 pole DC motor?

(A) Varying the number of turns in coil

(B) Making series connection of coils

(C) Making parallel connection of coils

(D) Making current flow in different direction

49. In any DC generator the emf generated in the armature is maximum, when the :

(A) rate of change of flux linkage is minimum

(B) rate of change of flux linkage is maximum

(C) conductor moves parallel to the maximum flux area

(D) conductor moves perpendicular to the minimum flux area

50. What happens when the supply terminals of a D.C shunt motor are interchanged?

(A) The motor will stop

(B) The direction of rotation will reverse

(C) The motor will run at its normal speed in the same direction as before

(D) The motor will run much faster in the same direction

51. For starting a slipring induction motor ———————— starter is used.

(A) D.O.L starter

(B) Rotor resistance starter

(C) Autotransformer starter

(D) A star delta starter

52. The speed of rotor of an induction motor is :

(A) The same as synchronous speed

(B) Higher than synchronous speed

(C) Less than synchronous speed

(D) None of these

53. The synchronous speed of a 4 pole motor at 50 Hz can be :

(A) 1500 RPM

(B) 1000 RPM

(C) 3000 RPM

(D) 750 RPM

54. Thermal overload relays are ———————— than magnetic overload relays.

(A) faster

(B) slower

(C) much bigger

(D) zero

55. The purpose of back up fuse is to provide protection against :

(A) Over voltage (B) Over load

(C) Low current (D) Short-circuit

56. When the rotor is stationary the frequency of rotor current is :

(A) Same as supply frequency (B) Less than supply frequency

(C) More than supply frequency (D) Zero

57. The fractional slip of an induction motor is the ratio :

(A) rotor cu loss/rotor input (B) stator cu loss/stator input

(C) rotor cu loss/rotor output (D) rotor cu loss/stator cu loss

58. If starting winding of a single phase induction motor is left in the circuit, it will :

(A) draw less current (B) run faster

(C) draw excessive current (D) spark at light loads

59. Which of the following motor operate on AC and DC supply?

(A) Universal motor (B) Shaded pole motor

(C) Reluctance motor (D) Shunt motor

60. If a single phase induction motor runs slower than normal, the more likely defect is :

(A) improper fuses (B) shorted running winding

(C) open starting winding (D) worn bearing

61. For the range extension of DC ammeter ———————— is used.

(A) CT (B) Multiplier

(C) Shunt (D) PT

62. A Transformer transforms :

(A) Frequency (B) Voltage

(C) Current (D) Voltage and current

63. The transformer oil used in a transformer provides :

(i) Cooling and insulation

(ii) Insulation and conduction

(iii) Cooling and lubrication

(iv) Insulation and cooling

(A) Both (i) and (iii)
(B) Both (i) and (iv)
(C) Both (iii) and (ii)
(D) Both (i) and (ii)

64. Which of the following is incorrect?

(i) Megger – for checking insulation resistance.

(ii) Lux meter – measure the amount of amplitude in a work space.

(iii) Clamp meter – resistance.

(iv) Tachometer – revolution per minute.

(A) Both (i) and (ii)
(B) Both (iv) and (i)
(C) Both (iii) and (iv)
(D) Both (ii) and (iii)

65. Energy meter can be classified as ———— instrument.

(A) indicating instrument
(B) recording instrument
(C) deflecting instrument
(D) integrating instrument

66. The most efficient form of damping used in electrical instrument is :

(A) air friction damping
(B) fluid friction damping
(C) eddy current damping
(D) none of these

67. The starting torque of shaded pole motor is :

(A) low
(B) high
(C) medium
(D) zero

68. The rotor of a split phase motor receives its power from :

(A) sliprings
(B) magnetic induction
(C) magnetic repulsion
(D) magnetic attraction

69. The principle of operation of auto transformer is :

(A) mutual induction (B) self induction

(C) repulsion (D) attraction

70. A capacitor-start single phase motor will usually have a P.F of :

(A) 0.8 leading (B) unity

(C) 0.8 lagging (D) zero

71. The mean of the candle power of a light source in all direction above or below the horizontal plane is called as :

(A) Mean Spherical Candle Power

(B) Mean Hemispherical Candle Power

(C) Mean Horizontal Candle Power

(D) None of these

72. The outer tube of a high pressure metal halide lamp is made of borosilicate glass. Select the correct reason from the list :

(A) Increase the lighting effect

(B) Withstand heavy temperature

(C) Withstand atmospheric temperature

(D) Reduce the ultra violet radiation from the lamp

73. Which type of material is used in LED to get green light?

(A) Indium gallium nitride alloys

(B) Aluminum gallium indium phosphide alloys

(C) Aluminum gallium arsenide alloys

(D) Gallium phosphide

74. As per IE standards, what should be the insulation resistance between the body of the water heater and the connecting cable?

(A) 0.01 Kilo Ohm (B) 1.00 Kilo Ohm

(C) 0.01 Mega Ohm (D) 1.00 Mega Ohm

75. From the given list, which is used as the heating unit of an electrical kettle?

(A) Inductive filament
(B) Flat wire sealed
(C) Concealed wire in metal tube
(D) Open filament

76. What is produced by doping silicon with arsenic?

(A) N-type semiconductor
(B) P-type semiconductor
(C) PN-type semiconductor
(D) PS-type semiconductor

77. The conductivity of semiconductors is increased by adding impurities with pure semiconductor material. How many electrons in an atom of donor impurity?

(A) 3
(B) 4
(C) 5
(D) 6

78. In the following special purpose diode, which is formed by metal and semiconductor?

(A) Schottky diode
(B) Varactor diode
(C) Tunnel diode
(D) Zener diode

79. The ripple factor of a power supply is a measure of :

(A) Filter efficiency
(B) Diode rating
(C) Purity of power output
(D) Voltage regulation

80. In a normal transistor circuit, the proper biasing is :

(A) Emitter Base junction is reverse, Collector Base junction is forward
(B) Emitter Base junction is forward, Collector Base junction is forward
(C) Emitter Base junction is reverse, Collector Base junction is reverse
(D) Emitter Base junction is forward, Collector Base junction is reverse

81. From the given list of generating stations, which has low running cost?

(A) Nuclear
(B) Hydro
(C) Thermal
(D) Diesel

82. Which of the following is generally used as a moderator in nuclear power plants?

(A) Graphite
(B) Heavy water
(C) Concrete
(D) Graphite and concrete

83. From the given list choose the correct group of conventional energy sources :

(A) Hydropower, Geothermal energy, Tidal energy
(B) Nuclear energy, Solar energy, Hydro power
(C) Oil, Natural gas, Firewood
(D) Coal, Firewood, Biogas

84. Biogas is a mixture of :

(A) Methane and Hydrogen
(B) Methane and Helium
(C) Methane and Nitrogen
(D) Methane and Carbon dioxide

85. Arrange the following from smallest to largest in a photo voltaic system (PV system) :

(i) Module
(ii) Array
(iii) Solar cell
(iv) Array field

(A) (iii)-(ii)-(iv)-(i)
(B) (iii)-(i)-(ii)-(iv)
(C) (ii)-(iv)-(i)-(iii)
(D) (ii)-(iv)-(iii)-(i)

86. The knowledge of diversity factor helps in determining :

(A) Plant capacity
(B) Average load
(C) Peak load
(D) KWH generated

87. Which of the following places is not associated with nuclear power plants in India?

(A) Narora
(B) Tarapur
(C) Bangalore
(D) Kota

88. A penstock is used as a conduit between :

(A) The steam chest and turbine in a thermal station

(B) A dam and turbine in hydro station

(C) The turbine and discharge drain

(D) The heat exchanger and the turbine in a nuclear power plant

89. Wind energy is harnessed by using :

(A) Electron generator (B) Vapor generator

(C) Turbine generator (D) Steam generator

90. A diesel generating plant running on 400V, 50 Hz, three phase low tension (LT) supply for 10 hours. The load comprises lighting load of 2.5 KW @0.9 power factor lagging on '**R**' phase, a heater load of 5KW @UPF on '**Y**' phase and a three phase SCIM drawing 5KW @0.8 power factor lagging. What is the total energy consumption by the load?

(A) 125 units (B) 121 units

(C) 100 units (D) 75 units

91. Cables used for 33 KV to 60 KV underground services are :

(A) High tension cables (B) Extra high tension cables

(C) Super tension cables (D) Extra super voltage cables

92. As per Indian Electricity rule in overhead system, the recommended span length for RCC poles is :

(A) 40 – 50 meters (B) 50 – 80 meters

(C) 80 – 100 meters (D) 100 – 300 meters

93. From the given list find the insulator used for distribution lines up to 33 KV is :

(i) Pin insulator

(ii) Reel insulator

(iii) Post insulator

(iv) Strain insulator

(A) Only (i) & (iv) (B) Only (i) & (ii)

(C) Only (ii) & (iii) (D) Only (iii) & (iv)

94. The cause for current in a transmission line under no load condition is due to :

(A) Spinning reserve
(B) Corona effect
(C) Capacitance of line
(D) Back flow from earth

95. Which compensation is required for improving power factor in feeder voltage controller?

(A) Synchronous condenser
(B) Shunt capacitor
(C) Series capacitor
(D) Shunt and series capacitor

96. Which of the following voltage level is used in primary transmission?

(A) 400 V
(B) 11 KV
(C) 33 KV
(D) 400 KV

97. A DC-3 wire distributor system requires how much copper as compared with a DC-2 wire system?

(A) Only 83.33%
(B) Only 66.66%
(C) Only 33.33%
(D) Only 31.25%

98. What type of insulator is used at dead ends of and straight lines as suspension type for voltages 3.3 KV and above?

(A) Disc insulator
(B) Stay insulator
(C) Strain insulator
(D) Pin insulator

99. A uniformly loaded DC distributor is fed at both ends with equal voltages. As compared to a similar distributor fed at one end only, the drop at the middle point is :

(A) One fourth
(B) One third
(C) One half
(D) Twice

100. In a DC 3 wire distributor using balancers and having unequal loads on the two sides :

(A) Both balancers run as generator
(B) Both balancers run as motor
(C) Balancer connected to lightly loaded side run as a motor
(D) Balancer connected to heavily loaded side run as a motor

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