CURRENT ELECTRICITY

1. A charged particle is released from rest in a region of steady and uniform electric and magnetic fields which are parallel to each other. The particle will move in a

(1) Straight line (2) circle (3) helix (4) Cycloid

2. Which of the following is analogous to momentum in electricity?

(1) LI (2) VI (3) LQ (4) LC

3. a proton is projected horizontally eastward in a uniform magnetic field, which is horizontal southward in direction. The proton will be deflected

(1) Upward (2) downward

(3) Northward (4) southward

4. The dimension of the magnetic field in M,L ,T and C (coulomb) is given as

(1)$MT^{-1}C^{-1}$

(2)$MT^{-2}C^{-1}$

(3)$MLT^{-1}C^{-1}$

(4)$MT^{2}C^{-2}$

5. A charged particle moves through a magnetic field perpendicular to its direction then.

(1)Both momentum and kinetic energy of the particle are constant

(2)Both momentum and kinetic energy of the particle are constant

(3)Kinetic energy changes but the momentum is constant

(4)The momentum changes but the kinetic energy is constant.

6. which of the following particles will describe smallest circle when projected perpendicular to a magnetic field?
   (1) Ne^+ (2) He^+ (3)proton (4) electron

7. In the circuit diagram, the readings of the ammeter and voltmeter are 2A and 120V respectively. If the value of R is 75Ω, then the voltmeter resistance will be
   (1) 100Ω (2) 150Ω (3) 300Ω (4) 75 Ω

8. An electric current is passed through a circuit containing two wires of the same material connected in parallel. If the lengths and radii of the wires are in the raio 4/3 and 2/3, then the ratio of the currents passing through the wires will be

(1) 8/9 (2) 1/3 (3) 3 (4) 2

9. a long wire carries a steady current .It is bent in the form a circle of one turn and the magnetic field at the centre of the coil is B. It is then bent in to a circular loop of n turns. The magnetic field at the centre of the coil will be

(1) 2nB (2) n^2B (3) nB (4) $2n^2B$

10. Two long conductors, separated a distance 'd' carry current I_1 and I_2 in the same direction. They exert a force a F on each other. Now the current in one of them is increased to two times and the direction is reversed. The distance is also increased to 3d. The new value of the force between them is

(1)- 2F/3 (2) F/3 (3)-2F(4) –F/3

11. An ammeter reads up to 1 ampere. Its internal resistance is 0.81 ohm. To increase the range to 10 A the value of the required shunt (in ohm) is

(1) 0.3 (2) 0.9 (3) 0.09 (4) 0.03

12. If a wire of resistance is melted and re-casted to one fourth of its length, then the new resistance of the wire will become

(1) 1/8th (2) ½ (3) 1/16th (4) $1/4^{th}$

13. Two batteries one of emf 18 V and internal resistance 2Ω and other of emf 12V and internal resistance 1Ω are connected as shown in the figure. The reading of the voltmeter is

(1) 30V (2) 18V (3) 15V (4)14V

14. The current in a circuit containing a resistance R is 5 amps. When an additional resistance of 3Ω is inserted the current decreases to 2 amp. The

original resistance of the circuit (in ohm) is
(1) 3 (2) 4 (3) 2 (4) 6

15. A uniform conductor of resistance R is cut into 20equal pieces. Half of them is joined in series and the remaining half of them are connected in parallel. If the two combinations are joined in series, the effective resistance of all the pieces will be
(1) R (2) R/2 (3) 101R/200(4)201/200

16. A conductor of resistance 2Ω is stretched uniformly till its length is doubled. The wire is now bent in the form of a circle. The effective resistance between the any two points which are 1/4the circumference apart is
(1) 1.33Ω 2) 2 Ω (3) 0.75 Ω (4) 1.5 Ω

17. In the hydrogen atom the electron moves around the proton with a speed of 2.0×10^{6} ms^{-1} in a circular orbit of radius 5.0×10^{-11} m. what is equivalent dipole moment?
(1) $2x10^{-24}$ Am^2 (2) $4x10^{-24}Am^2$
(3) $8X\ 10^{-24}$ Am^{-2} (4) $16X\ 10^{-24}$ Am^2

18.An alternating voltage (in volts) is given by $V=200\sqrt{2}\sin(100t)$ is connected to a 1μF capacitor through an ac ammeter. The reading of the ammeter will be

(1) 10mA (2) 20mA (3) 40mA (4) 80mA

19. an inductive coil has a resistance of 10Ω.when an ac signal of frequency 100Hz is fed to the coil, the applied voltage leads the current by 45^0. What is the inductance of the coil?
(1) 10m H (2) 12mH (3) 16mH (4) 20mH

20. In an ac circuit the potential difference V and current are given respectively by V=100 sin (100t) volt and I=100 sin (100t +60^0) mA. The power dissipated in the circuit will be
(1)10^4 W (2) 10W (3) 2.5 W (4) 5W.

21. An electric heater consumes 500W when connected to a 100V line. If the line voltage becomes 150V, the power consumed will be
(1)500W (2)750 W (3) 1000W (4) 1125W

22. A current of 1A is passed through a coil across which is a potential difference of 210V. The coil which embedded in ice. Then the ice that melts per hour is

(1) 2.5 kg (2) 2.1 kg (3) 3kg (4) 4.2kg

23. An electric cable of copper has just one wire of radius 9mm. Its resistance is 5 ohms. This single copper wire of the cable is replaced by six different well insulated copper wires each of radius 3mm. the total resistance of the cable will now be equal to

(1) 7.5 Ω (2) 45Ω (3) 90 Ω (4) 270Ω

25. A conductor of resistance of 3Ω is stretched uniformly till its length is doubled. The wire is now bent in the form of an equilateral triangle. The effective resistance between the ends of any side of the triangle in ohms is

(1) 9/2 (2)8/3 (3) 2 (4) 1

26. An electron in the potentiometer wire experiences a force of 3.2×10^{-19} N. the length of the potentiometer wire is 4m. The emf of the battery across the wire is

(1) 3.2V (2) 1.6V (3) 4.8V (4) 8V

27. If two bulbs of 25W and 100W respectively each rated at 220V connected in series with a supply of 440V, which bulb will glow brighter?

(1)25W bulb (2)100W bulb
(3) both with same brightness bulbs
(4) first 25W bulb and then 100W bulb

28. The resistance of the coil of an ammeter is R. the shunt required to increase its range four-fold should have a resistance;

(1) R/3 (2) R/4 (3)4R (4) R/5

29. Two particles accelerated with same voltage enter a uniform magnetic field perpendicularly the radii of the circular Paths are R_1 and R_2, the charge on the particles is same, the ratio of m_1/m_2 is

(1)$(R_2/R_1)^2$ (2) R_2/R_1 (3) R_1/R_2
(4) $(R_1/R_2)^2$

30. An electron moving toward the east enters a magnetic field directed towards the north. The force on the electron will be directed:

(1) Vertically upward
(2) vertically downward
(3)towards the west
(4) towards south

31. If only 2% of the main current is to be passed through a galvanometer of resistance G then the resistance of the shunt will be

(1)G/50 (2) G/49 (3) 50G (4) 49G

32. A coil is placed in transverse magnetic field of 0.02T. This coil starts shrinking at a rate of 1mm/sec. when its radius is 4cm, then what is the value if the induced emf.

(1) 2μV (2) 2.5μV (3) 5μV (4) 8μV

33. on connecting a battery to the two corners of a diagonal of a square conductor frame of side ‘a’ , the magnitude of the magnetic field at the centre

will be

(1) zero (2) $\mu_0/\pi a$ (3) $2\ \mu_0/\pi a$ (4)$4\ \mu_0/\pi a$

34. A wire of length carrying a current i is bent in the form a circle . The magnitude of the magnetic moment is
(1) $iL^2/4\pi$ (2) $iL^2/2\pi$ (3) $iL/4\pi$ (4) πiL^2

35. A coil and a bulb are connected in series with an AC source. If a soft iron rod is inserted in to the inductive coil, the intensity of the bulb will become

(1) dim (2) intense (3) unchanged (4)go out

36. The resistance of a wire is 10 ohm. It is drawn in order to increase its length by 10%.the new resistance of the wire will be

(1) 8Ω (2)8 Ω (3)12 Ω (4)15 Ω

37. In the following figure, circuit of wheat stone's bridge is represented. When the ratio arms P and Q are almost equal then the bridge gets balanced at R=400Ω .If P and Q are mutually interchanged then the bridge gets balanced at R=441Ω. The value of unknown resistance X will be
(1) 402.Ω (2) 403 Ω (3) 404Ω (4) 420Ω

38. A student connects four cells ,each of internal

resistance 1/4Ω in series. One of *the* cells is incorrectly connected because its terminals are reversed. The value of external resistance is 1 Ω. If the emf of each cell is 1.5 volt, then current in the circuit is

(1)4/3 A (2) zero (3)3/4 A (4) 1.5 A

39. The potential difference between the ends of 4 Ω resistance in the given circuit is

(1) 1.2V (2)2.6V (3)6.4V (4) 4.8V

40. A wire emits 80J of energy in 10 seconds when a current of 2A is passed through it. The resistance of the wire in ohms will be

(1) 0.5 (2) 2 (3) 4 (4)**20**

41. A battery of 15V and of negligible internal resistance is connected to the Rheostat XZ of 1kΩ. The resistance of Yz part is 500Ω .the reading of the ammeter will be.

(1)1A (2) 0.1A (3) 0.01A (4) 0.001 A

42. The potential difference between the points A and B in the adjoining diagram will be

43. A bulb rated 4.5W, 1.5V is connected as shown in the figure. The emf of the cell needed to make

the bulb glow at full intensity is

(1) 4.5V (2)1.5V (3)2.67V (4) 13.5V

44. For drawing a current of 2A for 6 minutes in a circuit 1000J of work is to be done. The emf of the source in the circuit is

(1) 3.10V (2)2.03V (3)1.68V (4) 1.38 V

45. The internal resistance of a cell of emf is 0.1Ω. It is connected to a resistance of 3.9Ω. the voltage across the cell will be
(1) 0.52V (2) 1.68V (3) 1.95V (4) 2.71V

46. When a resistance of 2Ω is connected across the terminals of a cell. The current is 0.5A. But when the resistance across the cell is 5Ω, the current is 0.25A. The emf of the cell is

(1)2.0V(2)1.0V (3)1.5V (4) 0.5V

47.A wire is stretched so that its radius becomes one-third of the original value. The value of the resistance as compared to original value is

(1) 9:1 (2) 27:1 (3) 81:1 (4) 3:1

48.A battery supplies 150W and 196W power to two resistors of 6Ωand 4Ω when they are connected separately to it. The internal

resistance of the battery is

(1) 2.5Ω (2) 2 Ω (3) 1 Ω (4) 0.5 Ω

49. A voltmeter has a resistance of 20K. When it is connected in series with a Resistance R across 230V supply it reads 200V.what is the value of R?

(1) 2kΩ (2) 3kΩ (3) 4kΩ (4)1k Ω

50. Three conductors draw currents 1A,3A and 6A when connected to a battery of negligible internal resistance in turn. If they are connected in series across the same battery, the current drawn will be

(1) 3/2 A(2) 2/3A (3) 4/3A (4) 5/3 A

51. There are six resistors each of value 0.6Ω. The minimum resistance that can be obtained with them is

(1) 0.23Ω (2) 0.4Ω (3)0.3Ω (4)0.1Ω

52. a steady current is flowing in a conductor of non-uniform cross-section. The charge passing through any cross section per unit time is

(1) directly proportional to the area of cross-section
(2) Inversely proportional to the area of cross section
(3) Proportional to the square of the area of cross-section
(4) Independent of the area of cross-section

53.a set f ‘n’ identical resistors each of resistance R ohm when connected in reries have a effective resistance of x ohms and when connected in parallel the effective resistance of Y ohms. Then the relation between R,X and Y is

(1)$R=\sqrt{XY}$ (2) $R=Y\sqrt{X}$ (3) $R=X\sqrt{Y}$ (4)$\sqrt{R}=XY$

54. what is maximum number of 100W,200V lamps which can be connected in a circuit having a fuse wire of safe current 5A

(1) 5 (2)10 (3)20 (4)40

55.A battery of emf 4V and internal resistance r. this battery is connected to an external resistance of 2 ohm, a current of 1 amp flows in the circuit. How much current will flow if the terminals of the battery are connected directly?

(1) 1A (2) 2A (3) 4A (4)infinite

56. seven identical resistors of 20Ω are connected in the circuit as shown in the figure. The reading of the ammeter is

(1)1/10A (2)2/10A (3)4/10A (4)7/10A

57. If the resistivity of the potentiometer wire is ρ

and area of cross section A, the potential gradient along the wire will be (I is the current)

(1)I ρ/A (2) I/Aρ (3)IA/ρ (4)Iaρ

58. Two resistors connected in parallel give effective resistance of 1.2Ω. If one of the resistances is broken , the effective resistance becomes 2Ω. Then the resistance of the wire which is broken is

(1) 2 Ω (2) 3Ω (3) 4 Ω (4) 6Ω

59. Electrons moving at right angles to a uniform magnetic field travel in a circular orbit in one microsecond. The magnetic field is

(1) $1x10^{-5}T$ (2) $1.8X10^{-5}T$ (3) $3.6X10^{-5}T$ (4) $4.5X10^{-5}T$

60. A horizontal overhead power line carries a current of 90A in the east west direction. The magnitude and direction of magnetic field due to current 1.5m below the line is

(1) $1.2X10^{-5}T$ towards west
(2)$1.2\ x10^{-5}T$ towards south
(3) $4x10^{-5}T$ towards south
(4) $4x10^{-5}T$ towards west

61. A horizontal wire 0.1 m long carries a current of 5A. The magnitude of the magnetic field which

can support the weight of this wire is (assume mass of the wire as $3X10^{-4}kg$)

(1) $0.6x10^{-3}T$ (2) $10x10^{-3}T$
(3) $5.88x10^{-3}T$ (4) $2x10^{-3}T$

62. The dimensional formula for the magnetic flux linked with the surface is

(1)$MLT^{-2}A^{-1}$ (2) $ML^{2}T^{-1}A^{-1}$
(3)$ML^{2}T^{-2}A^{-1}$ (4) $ML^{2}T^{-2}A$

63. A 100V voltmeter having internal resistance of 20k Ω ,when connected in series with a large resistance R across a110V line reads 5V. The magnitude of resistance R is
(1)210 Ω (2)310 Ω (3)420 Ω (4)440 Ω

64. In a series LCR circuit at resonance the current is

(1) Leads or lag behind the voltage
(2) Always in phase with the source voltage
(3) Always lags behind source voltage
(4) Always leads the source voltage by π/4

65. The rate of heating of 20A ac mains (rms) is same as the rate of heating of direct current of

(1)10A (2)5√2A (3)10√2A (4)20√2A

66. If the resistance wire of the right gap of

metrebridge is heated the balance point shifts to

(1)The left (2) the middle (3) the right (4) any point.

67. A proton and electron both moving with same velocity v enter in to a region of magnetic field directed perpendicular to the velocity of the particles. They will now move in a circular orbits such that

(1) Their time periods will be same
(2) The time period for proton for will be higher
(3) Time period for electron will be higher
(4) Their orbital radii will be same

68. If a current is passed in a spring, it
(1) Gets compressed
(2) Gets expanded
(3) Oscillates
(4) Remains unchanged.

69. Two electrons move parallel to each other with equal speed v. the ratio of magnetic and electrical forces between them is

(1) v/c (2)c/v (3)v^2/c^2 (4)C^2/v^2

70. A car moves on a plane road. The induced emf in the axle connecting the two wheels is maximum when it moves
(1) eastward at the equator

(2) westward at the equator
(3) eastward at latitude of 45^0
(4) At the poles.

71. when the frequency of the AC is doubled, the impedance of an LCR circuit

(1)is halved
(2)is doubled
(3)increases
(4)decreases

72. The current in a wire is directed towards east and the wire is placed in the magnetic field directed towards north. The force on the wire is

(1) Vertically upwards
(2) Vertically downwards
(3) Due south
(4) Due east

73.An electron and a proton with equal momentum enter perpendicularly into a uniform magnetic field.
(1) The path of proton shall be more curved than that of electron
(2) The path of proton shall be less curved than that of electron
(3) Both are equally curved
(4) Path of both will be straight line

74. A charged particle with a velocity $2x10^3$m/s passes undeflected through electric and magnetic

fields. If magnetic field is 1.5tesla, electric field intensity is

(1)$2x10^3$N/C (2)$1.5x10^3$N/C
(3)$3\ x10^3$N/C (4) $4/3\ x10^3$N/C

75. when a charge enter into a transverse magnetic field, the frequency will be

(1)2 μm/qB (2)qB/2πm (3)qB/μm (4) μm/qB

76. To convert the range of a G ohm resistance voltmeter from V to nV, the value of series resistance needed is
    (1)(n-1)G
    (2)G/n
    (3)nG
    (4)G/(n-1)

77. a charged particle is projected in a plane perpendicular to a uniform magnetic field. The area bounded by the path described by the particle is proportional to

    (1)the velocity (2)the momentum
    (3)the kinetic energy (4)none of these

78. In an series LCR circuit the potential difference between the terminals of inductance is 60V, between terminals of capacitor is 30V and between the terminals of resistance is 40V. The

supply voltage will be

(1)50V (2)70v (3)130V (4)10V

79. In the LCR series circuit, capacitance is changed from C to2C.for the resonant frequency to remain unchanged , the inductance should be changed from l to
(1)4L (2)2L (3)L/2 (4)L/4

80. a charged particle moving in a uniform magnetic field penetrates a layer of lead and loses one half of its kinetic energy. The radius of curvature changes to

(1) twice the original radius
(2) times the original radius
(3) √2half the original radius
(4) 1/√2 times the original radius

81. The deflection in a moving coil galvanometer is reduced to half, when it is shunted with a 40 ohm coil. The resistance of the galvanometer is
(1)80 ohm (2)40 ohm (3)20 ohm (4)15 ohm

82. The radius of curvature of the path of a charged particle in a uniform magnetic field is directly proportional to

(1) the charge on the particle
(2) the momentum of the particle
(3)the intensity of the field

(4) the energy of the particle

83.a battery of emf 10V and internal resistance 0.5 ohm is connected across a variable resistance R. the value of R for which the maximum power delivered in it is given by

(1)2.0 ohm (2) 0.25 ohm (3)1.0 ohm (4)0.5 ohm

84. If two bulbs of 25W and 100W each rated at 200V are connected in series with a supply of 440V, which bulb will fuse

(1) 100W bulb (2)25w bulb
(3)both of them (4)none of them

85. If an electron describes half a revolution in a circle of radius r in a magnetic field B, the energy acquired by it is

(1) $1/2mv^2$ (2)$1/4mv^2$ (3)zero (4) πr X Bev

86.when the number of turns in a coil is doubled without any change in the length of the coil, its self inductance becomes

(1)four times (2)doubled (3)halved (4)squared

87.the equation for ac current is given by $I=50\sqrt{2}\sin 400\pi t$. The the frequency and rms value of current are

(1) 200Hz, 50A
(2)400πHz, $50\sqrt{2}$A

(3)200Hz, $50\sqrt{2}$A
(4)50Hz, 200A

88. A potential difference V is applied to a conductor of length and radius r. when the potential difference is doubled, the drift velocity is
(1) halved (2)unchanged (3)doubled (4)quadrupled.

89. the V-I graph for a conductor at temperatures T1 and T2 are as shown in the figure. The term (T1-T2) is proportional to
(1)cos2 ϴ
(2)sin2 ϴ
(3)cot ϴ
(4)tan2 ϴ

90. an electron is moving near to a conducting loop, then the induced current in the loop is
(1) Clockwise
(2) anticlockwise
(3) first anticlockwise and then clockwise
(4) no current is induced

91. The frequency of a series LCR circuit at resonance (L=10mH and C=1.0μF) is

(1) $1.0X10^4$ Hz
(2) $1.0X10^2$ Hz
(3) $1.0X10^4$radian/sec
(4) $1.0x10^2$ radian/sec

92. The electron in the hydrogen atom is revolves around the proton at $5x10^{15}$rps in an orbit of radius of radius $0.5A^0$.the current in the circle is
(1)0.4mA (2)0.8mA (3)1.2mA (4)1.6mA

93. when 2A current is passed through a tangent galvanometer, it gives a deflection of 30^0.For 60^0 deflection, the current through the TG is
(1) 1A (2) 2A (3) 6A (4) $2\sqrt{2}$A

94. In a series LCR circuit connected to an ac source, the resistance is is 3Ω and the reactance is 4Ω, then the power factor of the circuit is
(1)1 (2)0.6 (3)0.8 (4)0.5

95. An LR circuit connected to an ac source the phase angle between the voltage and current is 45^0. The the value of the inductive reactance is
(1) R/4 (2)R/2 (3)R (4)R/3

96. Two coils of inductance L each are connected in series with opposite magnetic fluxes. The resultant inductance is given by
(1)3L (2)L (3)) (4)2L

97.A coil of area $100cm^2$ having 50 turns it perpendicular to a magnetic field of intesnsity $0.02wb/m^2$.the resistance of the coil is 2 ohm.if it is removed in 1sec,from the magnetic field, the induced charge produced is
(1)5C (2)0.5C (3)0.05C (4)0.005C

98. In a series LCR circuit, the voltage across each of the components L,C and R is 100V. Then the applied source voltage is

(1) 150V (2)300V (3) 100V (4) 250V

99. Resistivity of the conductor depends on

(1) Length (2) area of cross-section
(3) temperature (4) volume

100. A heater coil is cut into two equal parts and they are joined parallel. When this is used to boil water, the heat generated n the coil

(1) Is halved (2) doubled
(3) become one fourth (4) increases four times

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