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SAIVEERA ACADEMY – 8098850809
REVOLUTION FOR LEARNING , COIMBATORE
12ᵀᴴ PHYSICS UNIT 1 -5 ONE MARKS (BOOK BACK AND BOOK INSIDE)

Marks : 100　　　　　　　　　　　　　　　　　　**Time : 1hr 45 min**

1. Which charge configuration produces a uniform electric field?
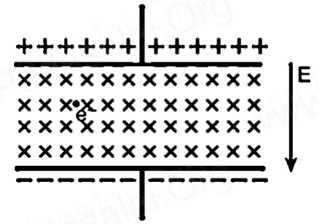(a) point Charge   (b) infinite uniform line charge
(c) uniformly charged infinite plane   (d) uniformly charged spherical shell

2. . A carbon resistor of (47 ± 4.7) k Ω to be marked with rings of different colours for its identification. Th e colour code sequence will be
 a) Yellow – Green – Violet – Gold   b) Yellow – Violet – Orange – Silver
 c) Violet – Yellow – Orange – Silver   d) Green – Orange – Violet – Gold

3. An electron moves straight inside a charged parallel plate capacitor of uniform charge density σ. Th e time taken by the electron to cross the parallel plate capacitor when the plates of the capacitor are kept under constant magnetic field of induction $\vec{E}$ is

(a)$\varepsilon_O \dfrac{elB}{\sigma}$　　　　　　　　　　　　　(b) $\varepsilon_O \dfrac{lB}{\sigma l}$

 (c) $\varepsilon_O \dfrac{lB}{\sigma e}$　　　　　　　　　　　　　(d) $\varepsilon_O \dfrac{lB}{\sigma}$

4. A thin semi-circular conducting ring (PQR) of radius r is falling with its plane vertical in a horizontal magnetic field B, as shown in the figure. The potential difference developed across the ring when its speed v, is
 (a) Zero
 (b) $\dfrac{Bv\pi r^2}{2}$ and P is at higher potential
 (c) $\pi r Bv$ and R is at higher potential
 (d) $2rBv$ and R is at higher potential
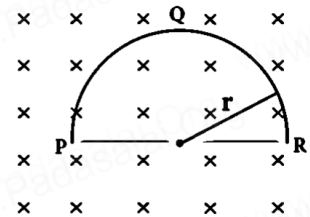
5. Two identical conducting balls having positive charges q_1 and q_2 are separated by a center to center distance r. If they are made to touch each other and then separated to the same distance, the force between them will be
(a) less than before   (b) same as before
(c) more than before   (d) zero

6. The force experienced by a particle having mass m and charge q accelerated through a potential difference V when it kept under perpendicular magnetic field $\vec{B}$ is

(a)$\sqrt{\dfrac{2q^3 BV}{m}}$　　　(b) $\sqrt{\dfrac{2q^3 B^2 V}{2m}}$　　　(c) $\sqrt{\dfrac{2q^3 B^2 V}{m}}$　　　(d) $\sqrt{\dfrac{2q^3 BV}{m^3}}$

7.Two wires of A and B with circular cross section made up of the same material with equal lengths. Suppose $R_A = 3 R_B$, then what is the ratio of radius of wire A to that of B?
 (a) 3　　　　　(b) $\sqrt{3}$　　　　　(c) $1/\sqrt{3}$　　　　　(d) 1/3

8. . A circular coil of radius 5 cm and 50 turns carries a current of 3 ampere. Th e magnetic dipole moment of the coil is
 (a) 1.0 amp – m²　　　(b) 1.2 amp – m²　　(c) 0.5 amp – m²　　　(d) 0.8 amp – m²

9. A parallel plate capacitor stores a charge Q at a voltage V. Suppose the area of the parallel plate capacitor and the distance between the plates are each doubled then which is the quantity that will change?
(a) Capacitance　　　　(b) Charge　　　　(c) Voltage　　　　(d) Energy density

10. A thin insulated wire forms a plane spiral of N = 100 tight turns carrying a current I = 8 m A (milli ampere). The radii of inside and outside turns are a = 50 mm and b = 100 mm respectively. The magnetic induction at the center of the spiral is

(a) 5 μT   (b) 7 μT   (c) 8 μT   (d) 10 μT

11.In India electricity is supplied for domestic use at 220 V. It is supplied at 110 V in USA. If the resistance of a 60W bulb for use in India is R, the resistance of a 60W bulb for use in USA will be

(a) R   (b) 2R   (c) *R/4*   (d) *R/2*

12. The flux linked with a coil at any instant t is given by $\emptyset_B = 10t^2 - 50t + 250$ The induced emf at t = 3s is

(a) $-190\ V$ (b) $-10\ V$ (c) $10\ V$ (d) $190\ V$

13. . If voltage applied on a capacitor is increased from V to 2V, choose the correct conclusion.

(a) Q remains the same, C is doubled   (b) Q is doubled, C doubled

(c) C remains same, Q doubled   (d) Both Q and C remain same

14. Three wires of equal lengths are bent in the form of loops. One of the loops is circle, another is a semi-circle and the third one is a square. They are placed in a uniform magnetic field and same electric current is passed through them. Which of the following loop configuration will experience greater torque ?

(a) circle   (b) semi-circle   (c) square   (d) all of them

15. When the current changes from +2A to −2A in 0.05 s, an emf of 8 V is induced in a coil. The co-efficient of self-induction of the coil is

(a) 0.2 H   (b) 0.4 H   (c) 0.8 H   (d) 0.1 H

16. In a large building, there are 15 bulbs of 40W, 5 bulbs of 100W, 5 fans of 80W and 1 heater of 1kWare connected. The voltage of electric mains is 220V. The minimum capacity of the main fuse of the building will be

(a) 14 A   (b) 8 A   (c) 10 A   (d) 12 A

17. An electric field $\vec{E} = 10x\hat{\imath}$ exists in a certain region of space. Then the potential difference V = V$_o$ − V$_A$, where Vo is the potential at the origin and V$_A$ is the potential at x = 2 m is:

(a) 10 J   (b) – 20 J   (c) +20 J   (d) -10J

18. A wire of length *l* carries a current I along the Y direction and magnetic field is given by $\vec{B} = \frac{\beta}{\sqrt{3}}(\hat{\imath} + \hat{\jmath} + \hat{k})$ The magnitude of Lorentz force acting on the wire is

(a) $\sqrt{\frac{2}{\sqrt{3}}}\beta Il$ (b) $\sqrt{\frac{1}{\sqrt{3}}}\beta Il$ (c) $\sqrt{2}\beta Il$ (d) $\sqrt{\frac{1}{2}}\beta Il$

19. A circular coil with a cross-sectional area of 4 cm^2 has 10 turns. It is placed at the centre of a long solenoid that has 15 turns/cm and a cross-sectional area of 10 cm^2. The axis of the coil coincides with the axis of the solenoid. What is their mutual inductance?

(a) 7.54 μH   (b) 8.54 μH   (c) 9.54 μH   (d) 10.54 μH

20. The internal resistance of a 2.1 V cell which gives a current of 0.2 A through a resistance of 10 Ω is

a) 0.2 Ω   b) 0.5 Ω   c) 0.8 Ω   d) 1.0 Ω

21. An electric dipole is placed at an alignment angle of 30o with an electric field of 2×10^5 N C^{-1}. It experiences a torque equal to 8 N m. The charge on the dipole if the dipole length is 1 cm is

(a) 4 mC   (b) 5 mC   (c)   8 mC   (d) 7 mC

22. A non-conducting charged ring of charge q, mass m and radius r is rotated with constant angular speed ω. Find the ratio of its magnetic moment with angular momentum is

(a) $\frac{q}{m}$ (b) $\frac{2q}{m}$ (c) $\frac{q}{2m}$ (d) $\frac{q}{4m}$

23. . In a transformer, the number of turns in the primary and the secondary are 410 and 1230 respectively. If the current in primary is 6A, then that in the secondary coil is

(a) 2 A   (b) 18 A   (c) 12 A   (d) 1 A

24. A piece of copper and another of germanium are cooled from room temperature to 80 K. The resistance of

a) each of them increases

b) each of them decreases

c) copper increases and germanium decreases

d) copper decreases and germanium increases

25. Four Gaussian surfaces are given below with charges inside each Gaussian surface. Rank the electric flux through each Gaussian surface in increasing order.

(a) D < C < B < A   (b) A < B = C < D

(c) C < A = B < D   (d) D > C > B > A
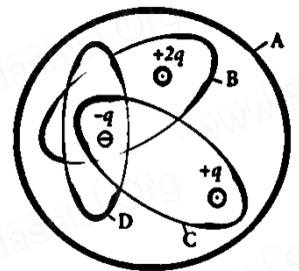
26. Two short bar magnets have magnetic moments 1.20 Am^2 and 1.00 Am^2 respectively. They are kept on a horizontal table parallel to each other with their north poles pointing towards the south. They have a common magnetic equator and are separated by a distance of 20.0 cm. The value of the resultant horizontal magnetic induction at the mid-point O of the line joining their centers is (Horizontal components of Earth's magnetic induction is 3.6 X 10^{-5} Wb m^{-2})

 (a) 3.60 X 10^{-5} Wb m^{-2} (b) 3.5 X 10^{-5} Wb m^{-2}

(c) 2.56 X 10^{-4} Wb m^{-2} (d) 2.2 X 10^{-4} Wb m$^-$

27. In Joule's heating law, when I and t are constant, if the H is taken along the y axis and I^2 along the x axis, the graph is

a) straight line   b) parabola   c) circle   d) ellipse

28. A step-down transformer reduces the supply voltage from 220 V to 11 V and increase the current from 6 A to 100 A. Then its efficiency is

(a) 1.2   (b) 0.83   (c) 0.12   (d) 0.9

29. Two metallic spheres of radii 1 cm and 3 cm are given charges of -1 x 10^{-2} C and 5 x 10^{-2} C respectively. If these are connected by a conducting wire, the final charge on the bigger sphere is

(a) 3 × 10^{-3}C   (b) 4 × 10^{-2} C

(c) 1 × 10^{-2} C   (d) 0.03 C

30. The vertical component of Earth's magnetic field at a place is equal to the horizontal component. What is the value of angle of dip at this place?

(a) 30º   (b) 45o   (c) 60º   (d) 90º

31. The temperature coefficient of resistance of a wire is 0.00125 per $^\circ$C. At 300 K, its resistance is 1 Ω. The resistance of the wire will be 2 Ω at

a) 1154 K   b) 1100 K   c) 1400 K   d) 1127 K

32. In an electrical circuit, R, L, C and AC voltage source are all connected in series. When L is removed from the circuit, the phase difference between the voltage and current in the circuit is π /3 . Instead, if C is removed from the circuit, the phase difference is again π /3 . The power factor of the circuit is

(a) 1/2   (b) $1/\sqrt{2}$ (c) 1   (d) $\sqrt{3}/2$

33. Three capacitors are connected in triangle as shown in the figure. The equivalent capacitance between the points A and C is

(a) 1μF   (b) 2 μF

(c) 3 μF   (d)1/4 μF
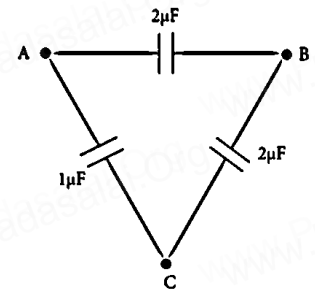
34. The dimension of $\frac{1}{\mu_o \varepsilon_O}$ is

(a) $[L\ T^{-1}]$ (b) $[L^2\ T^{-2}]$

(c) $[L^{-1}\ T]$ (d) $[L^{-2}\ T^2$

35. A wire connected to a power supply of 230 V has power dissipation P_1. Suppose the wire is cut into two equal pieces and connected parallel to the same power supply. In this case power dissipation is P_2 The ratio. $\frac{P_2}{P_1}$ is

(a)1   (b) 2   (c) 3   (d) 4

36. Which of the following are false for electromagnetic waves

 (a) transverse

(b) mechanical waves

(c) longitudinal

(d) produced by accelerating charges

37. Two points A and B are maintained at a potential of 7 V and -4 V respectively. The work done in moving 50 electrons from A to B is

(a) 8.80×10^{-17} J   (b) -8.80×10^{-17} J

(c) 4.40×10^{-17} J   (d) 5.80×10^{-17} J

38. Th e electric and the magnetic field, associated with an electromagnetic wave, propagating along X axis can be represented by

(a) $\vec{E} = E_o\hat{j}\ and\ \vec{B} = B_o\hat{k}$ (b) $\vec{E} = E_o\hat{k}\ and\ \vec{B} = B_o\hat{j}$

(c) $\vec{E} = E_o\hat{\imath}\ and\ \vec{B} = B_o\hat{j}$ (d) $\vec{E} = E_o\hat{j}\ and\ \vec{B} = B_o\hat{\imath}$

39. A toaster operating at 240 V has a resistance of 120 Ω. The power is

 a) 400 W   b) 2 W   c) 480 W   d) 240 W

40. A simple pendulum with charged bob is oscillating with time period T and let θ be the angular displacement. If the uniform magnetic field is switched ON in a direction perpendicular to the plane of oscillation then

(a) time period will decrease but θ will remain constant

(b) time period remain constant but θ will decrease

(c) both T and θ will remain the same

(d) both T and θ will decrease

41. In a series RL circuit, the resistance and inductive reactance are the same. Then the phase difference between the voltage and current in the circuit is

(a) π/4   (b) π/2   (c)π/6   (d) zero

42. In an electromagnetic wave in free space the rms value of the electric field is 3 V m^{-1}. The peak value of the magnetic field is

(a) 1.414×10^{-8} T   (b) 1.0×10^{-8} T

(c) 2.828×10^{-8} T   (d) 2.0×10^{-8} T

43. If the magnetic monopole exists, then which of the Maxwell's equation to be modified?.

(a) $\oint \vec{E}.d\vec{A} = \frac{Q_{enclosed}}{\varepsilon_0}$ (b) $\oint \vec{E}.d\vec{A} = 0$

(c) $\oint \vec{E}.d\vec{A} = \mu_o I_{enclosed} + \mu_0\varepsilon_0 \frac{d}{dt}\int \vec{E}.d\vec{A}$ (d) $\oint \vec{E}.d\vec{A} = -\frac{d}{dt}\emptyset_B$

44. A flat dielectric disc of radius R carries an excess charge on its surface. The surface charge density is σ. The disc rotates about an axis perpendicular to its plane passing through the center with angular velocity ω. Find the magnitude of the torque on the disc if it is placed in a uniform magnetic field whose strength is B which is directed perpendicular to the axis of rotation

(a) $\frac{1}{4}\sigma\omega\pi BR$ (b) $\frac{1}{4}\sigma\omega\pi BR^2$ (c) $\frac{1}{4}\sigma\omega\pi BR^3$ (d) $\frac{1}{4}\sigma\omega\pi BR^4$

45. The instantaneous values of alternating current and voltage in a circuit are
$i = \frac{1}{\sqrt{2}}\sin(100\pi t)A$ and $v = \frac{1}{\sqrt{2}}\sin(100\pi t + \frac{\pi}{3})V$ The average power in watts consumed in the circuit is

(a) ¼   (b) $\sqrt{3}/4$ (c) ½   (d) 1/8

46. Let $E = E_o \sin[10^6 x - \omega t]$ be the electric field of plane electromagnetic wave, the value of ω is

(a) 0.3×10^{-14} rad s^{-1} (b) 3×10^{-14} rad s^{-1}
(c) 0.3×10^{14} rad s^{-1} (d) 3×10^{14} rad s^{-1}

47. The electric and magnetic fields of an electromagnetic wave are
(a) in phase and perpendicular to each other
(b) out of phase and not perpendicular to each other
(c) in phase and not perpendicular to each other
(d) out of phase and perpendicular to each other

48. A radiation of energy E falls normally on a perfectly reflecting surface. The momentum transferred to the surface is
(a) E/c (b) $2E/c$ (c) Ec   (d) E/c^2

49. Which one of them is used to produce a propagating electromagnetic wave?.
(a) an accelerating charge   (b) a charge moving at constant velocity
(c) a stationary charge   (d) an uncharged particle

50. $\frac{20}{\pi^2}$inductor is connected to a capacitor of capacitance C. The value of C in order to impart maximum power at 50 Hz is
(a) 50 μF   (b) 0.5 μF   (c) 500 μF   (d) 5μ F

51. The relative permittivity of water is
(a)70   (b)80   (c)85   (d) 75

52. The magnitude of torque is maximum if $\theta =$
(a) 0º   (b) 90º   (c) 45º   (d) 180º

53. The potential due to a single point charge falls as
(a) r²   (b) r³   (c) 1/r   (d) 1/r²

54. The negative gradient of potential is
(a) current   (b)electric force
(c) torque   (d) electric field intensity

55. Which of the following cannot be units of electric field intensity?
(a) NC^{-1} (b) Vm^1 (c) JC^{-1} (d) JC^{-1}m^{-1}

56. Electrostatic force is stronger than gravitational force by
(a) 2.23×10^{39} times   (b) 2.23×10^{40} times
(c) 2.23×10^{38} times   (d) 2.23×10^{30} times

57. A hollow metallic spherical shell carrying an electric charge produces no electric field at points
a) on the surface of the sphere   b) inside the sphere
c) at infinite distance from the centre of the sphere   d) outside the sphere

58. The principle use in lightning conductors is
a) corona discharge   b) mutual induction   c) self-induction   d) electromagnetic induction

59. The work done in moving 500μC charge between two points on equipotential surface is
a) zero   b) finite positive   c) finite negative   d) infinite

60. The direction of electric field at a point on the equatorial line due to an electric dipole is
a) along the equatorial line towards the dipole
b) along the equatorial line away from the dipole
c) parallel to the axis of the dipole and opposite to the direction of dipole moment
d) parallel to the axis of the dipole and in the direction of dipole moment.

61. The value of relative permittivity of air is
a) 8.854×10^{-12} b) $9 \times 10^9 \, C^2 \, N \, m^{-2}$ c) 1   d) 8.854×10^{12}

62. The electric field intensity at a short distance r from uniformly charged infinite plane sheet of charge is
a) proportional to r   b) proportional to 1/r
c) proportional to $1/r^2$ d) independent of r

63. A dielectric medium is placed in an electric field E_0. The field induced inside the medium
a) act in the direction of the electric field E_0 b) acts opposite to E_0
c) acts perpendicular to E_0 d) is zero

64. The unit of the number of electric lines of force passing through a given area is
a) no unit   b) NC^{-1} c) Nm^2C^{-1} d) Nm

65. The capacitance of a capacitor is
a) directly proportional to the charge q given to it
b) inversely proportional to its potential V
c) directly proportional to the charge q and inversely proportional to the potential V
d) independent of both the charge q and potential V.

66. The brown ring at one end of a carbon resistor indicates a tolerance of
a) 1%   b) 2%   c) 5%   d) 10%

67. In the case of insulators, as the temperature decreases, the resistivity
a) decreases   b) increases   c) remains constant   d) becomes zero

68. The unit of conductivity is
a) mho   b) ohm   c) ohm – m   d) mho – m^{-1}

69. A graph is drawn taking potential difference across the ends of a conductor along x - axis and current through the conductor along the y-axis the slope of the straight line gives.
(a) resistance   (b) conductance   (c) resistivity   (d) conductivity

70. Peltier effect is the converse of
a) Joule effect   b) Raman effect
c) Thomson effect   d) Seebeck effect

71. Fuse wire
a) is an alloy of lead and copper   b) has low resistance
c) has high resistance   d) has high melting point

72. The unit of reduction factor of tangent galvanometer is
a) no unit   b) tesla   c) ampere   d) ampere / degree

73. The torque experienced by a rectangular current loop placed perpendicular to a uniform magnetic field is
a) maximum   b) zero   c) finite minimum   d) infinity

74. An ideal voltmeter has
a) zero resistance   b) finite resistance between zero and G

c) resistance greater than G but less than infinity   d) infinite resistance

75. Phosphor – bronze wire is used for suspension in a moving coil galvanometer because it has

a) high conductivity   b) high resistivity

c) large couple per unit twist   d) small couple per unit twist

76. The value of gyro magnetic ratio is

a) 8.8×10^{10} b) 8.8×10^{-20} c) 8.8×10^{-10} d) 8.8×10^{20}

77. Pole strength depends on

a) nature of materials of the magnet,   b)area of cross- section

c) the state of magnetization.   d)all of these

78. If a magnet is cut into two equal halves perpendicular to the length, then pole strength

a) remains same   b)reduced by half   c)increased to half   d)none of these

79. Susceptibility is nearly temperature independent for

a)diamagnetic material   b)paramagnetic material

c)ferro magnetic material   d)all of these

80.Identify the paramagnetic material in the following

a)Iron   b)Nickel   c)Cobalt   d) Platinum

81. Dimensional formula for magnetic flux is

a) $[MLT^{-2}A^{-1}]$ b) $[ML^2 T^{-2}A^{-1}]$ c) $[M^2 LT^{-2}A^{-1}]$ d) $[MLT^2A^{-1}]$

82.In an a.c. circuit with an inductor

a) Voltage lags current by $\pi/2$ b) voltage and current are in phase

c) voltage leads current by π d) current lags voltage by $\pi/2$

83. The unit of henry can also be written as

a) $V As^{-1}$ b) $Wb^{-1} A$ c) Ω s   d) all of these

84. The generator rule is

a) Fleming's left hand rule   b) Fleming's right hand rule

b) Maxwell's right hand corkscrew rule   d) Right hand palm rule

85. Lenz's law is in accordance with the law of

a) conservation of energy   b) conservation of charge

c) conservation of momentum   d) conservation of angular moment

86. In an A.C. Circuit

a) the average value of current is zero   b) the average value of square of current is zero

c) the average power dissipation is zero   d) the rms current is $\sqrt{2}$ times of peak current

87. Which of the following devices does not allow direct current (D.C.) to pass through?

a) Capacitor   b) Inductor   c) Resistor   d) All of these

88. The resonant frequency of RLC circuit is γ_0 The inductance is doubled. The capacitance is also doubled. Now the resonant frequency of the circuit is

a) $2\gamma_0$.   b)$\frac{\gamma_0}{2}$ c) $\frac{\gamma_0}{4}$ d) $\frac{\gamma_0}{\sqrt{2}}$

89. When the frequency of an a.c. circuit increases, the capacitive reactance offered by capacitor connected in the circuit

a) increases   b) decreases   c) remains the same   d) becomes zero

90. The coefficient of self – induction of a solenoid is independent of

a) the number of turns in coil   b) the area of cross – section of the coil

c) the length of the coil   d) the current passing through the coil.

a) The instantaneous emf and current equations of an a.c circuit are respectively

91. That part of the A.C, generator that passes. The current from the coil to the external circuit is

a) field magnet   b) split rings   c) slip – rings   d) brushes

92. In a three phase AC generator by three coils are fastened rigidly together and are displaced from each other by an angle

a) 90° b) 180° c) 120° d) 360°

93. In an AC Circuit with capacitor only, if the frequency of the signal is zero then the capacitive reactance is

a) Infinity   b) zero   c) finite maximum   d) finite minimum

94. The existence of electromagnetic waves was confirmed experimentally by

a) Hertz   b) Maxwell   c) Huygens   d) Planck

95. Electric filament lamp gives rise to

a) Line emission spectrum   b) continuous spectrum

c) band absorption spectrum   d) line absorption spectrum

96. In an electromagnetic wave

a) Power is equally transferred along the electric and magnetic fields

b) Power is transmitted in a direction perpendicular to both the fields

c) Power is transmitted along electric field

d) Power is transmitted along magnetic field

97. Electromagnetic waves are

a) Transverse   b) longitudinal

c) may be longitudinal or transverse   d) neither longitudinal nor transverse

98. Spectra of atomic hydrogen

a) Line absorption spectrum   b) continuous absorption spectrum

c) band absorption spectrum   d) line emission spectrum

99.The wavelength range of microwaves in electro magnetic spectrum

a) 8×10^{-7} m to 5×10^{-3} m   b) 1×10^{-3} m to 3×10^{-1} m

c) 10^{-13} m to 10^{-8} m   d) 1×10^{-14} m to 1×10^{-10} m

100.Which one the following has highest penetrating power

a) a) X – rays   b) γ– rays   c) U – V rays   d)microwaves