(1) What is the average value of the A.C. voltage over one complete cycle?

(a) $\frac{V_{max}}{2}$ (b) $\frac{2V_{max}}{2}$ (c) V_{max} (d) zero

Ans. (d)

(2) A short bar magnet has a length $2l$ and a magnetic moment $10Am^2$. Find the magnetic field at a distance of z = 0.1 m from its centre on the axial line. Here, l is negligible as compared to z.

(a) 4×10^{-3} T (b) 1×10^{-3} T (c) 3×10^{-3} T (d) 2×10^{-3} T

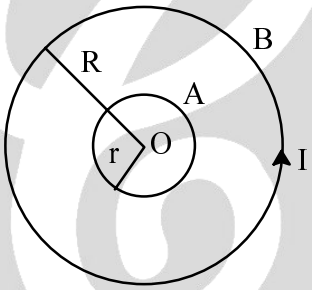
Ans. (d)

(3) A short bar magnet experiences a torque of magnitude 0.64J when it is placed in a uniform magnetic field of 0.32T, making an angle of 30° with the direction of the field. The magnetic moment of the magnet is ……..

(a) $2Am^2$ (b) 6 Am^2 (c) 4 Am^2 (d) none of these

Ans. (c)

(4) O is the centre of two coplanar concentric circular conductors, A and B, of radii r and R respectively as shown in the fig. Here. r <<< R. The mutual inductance of the system of the conductors can be given by



(a) $\frac{\mu_0 \pi r}{2R}$ (b) $\frac{\mu_0 R^2}{\pi_0 r}$ (c) $\frac{\mu_0 \pi R^2}{2r}$ (d) $\frac{\mu_0 \pi r^2}{2R}$

Ans. (d)

(5) The magnifying power of a telescope is m. If the focal length of the eye-piece is halved, then its magnifying power is …….

(a) 4m (b) $\frac{1}{2m}$ (c) $\frac{m}{2}$ (d) 2m

Ans. (d)

(6) A plane mirror produces a magnification of ……

(a) infinite (b) zero (c) +1 (d) –1

Ans. (c)

(7) 100π phase difference = …….. path difference

(a) 100λ (b) 50λ (c) 25λ (d) 10λ

Ans. (b)

(8) What will be the angle of diffraction for the first order maximum due to Fraunhofer

diffraction by a single slit of width 0.50mm, using light of wavelength 500nm?

(a) 1.5×10^{-3} rad (b) 1.5×10^{-4} rad

(c) 3×10^{-3} rad (d) 1×10^{-3} rad

Ans. (d)

(9) The condition for diffraction of m^{th} order minima is …….

(a) $d \sin\theta_m = (m-1)\frac{\lambda}{2}, m = 1, 2, 3....$ (b) $d \sin\theta_m = (m+1)\frac{\lambda}{2}, m = 1, 2, 3....$

(c) $d \sin\theta_m = \frac{m\lambda}{2}, m = 1, 2, 3....$ (d) $d \sin\theta_m = m\lambda, m = 1, 2, 3....$

Ans. (d)

(10) If a source is transmitting electro-magnetic waves of frequency 8.196×10^6 Hz, then the wavelength of the electro-magnetic waves transmitted from the source will be …..

(a) 3660 cm (b) 4230 mm (c) 4050 cm (d) 5090 cm

Ans. (a)

(11) The dimensional formula of $\frac{1}{\mu_0 \in_0}$ is …….

(a) $M^0L^2T^{-2}$ (b) $M^0L^1T^{-1}$ (c) $M^0L^{-2}T^{-2}$ (d) $M^0L^1T^{-2}$

Ans. (a)

(12) The photoelectric effect represent that …….

(a) light has a particle nature (b) proton has a wave nature

(c) electron has a wave nature (d) none of these

Ans. (a)

(13) Of the following transitions in the Hydrogen atom, the one which gives an emission line of the highest frequency is ……..

(a) n = 10 to n = 3 (b) n = 3 to n = 10 (c) n = 2 to n = 1 (d) n = 1 to n = 2

Ans. (c)

(14) How many neutrons are more than protons in $_{92}U^{235}$ nucleus?

(a) 143 (b) 51 (c) 49 (d) 54

Ans. (b)

(15) ……. has a pair of isomers

(a) $_{36}Kr^{86}$, $_{37}Rb^{87}$ (b) $_6C^{12}$, $_6C^{13}$

(c) $_{35}Br^{80}$ (d) $_{92}U^{235}$

Ans.

(16) The energy released in the explosion of an atom bomb is mainly due to ……..

(a) nuclear fusion (b) controlled nuclear chain reaction

(c) nuclear fission (d) none of these

Ans. (c)

(17) The potential difference applied to an X-ray tube is 5 kV and the current through it is 3.2 mA. The number of electrons striking the target per second is ……. (Take e = 1.6×10^{-19} C).

(a) 2×10^{16} (b) 4×10^{16} (c) 2×10^{-6} (d) 1.6×10^6

Ans. (a)

(18) For an electron in the second orbit of Bohr's Hydrogen atom, the moment of linear momentum is …….

(a) $\frac{h}{\pi}$ (b) $\frac{2h}{\pi}$ (c) $2\pi h$ (d) $n\pi$

Ans. (a)

(19) The current gain of a transistor in the common base mode is 0.9. If the change in the emitter current is 5 mA, the change in the collector current will be …….

(a) 0 mA (b) 5.6 mA (c) 4.5 mA (d) 4 mA

Ans. (c)

(20) In a CE, N – P – N transistor circuit, the emitter current is …….

(a) equal to the difference of the collector current and the base current
(b) less than the base current
(c) less than the collector current
(d) more than the collector current

Ans. (d)

(21) Which one of the following is a full duplex transmission system?

(a) Walky-talky (wireless used in the Army)
(b) Telephone
(c) Radio
(d) T.V.

Ans. (b)

(22) The relation between the maximum electron density N_{max} and the critical frequency f_c for the ionosphere can be given as …….

(a) $f_c = \sqrt{9\,N_{max}}$ (b) $f_c = 9\sqrt{N_{max}}$ (c) $f_c = \sqrt{9}\,N_{max}$ (d) none of these

Ans. (b)

(23) An electron hole pair is formed when light of maximum wavelength 6000Å is incident on the semiconductor. What is the band gap energy of the semiconductor? ($h = 6.62 \times 10^{-34}$ Js)

(a) 2.07 J (b) 2.07×10^{-19} J (c) 3.07×10^{-19} J (d) 3.31×10^{-19} J

Ans. (d)

(24) What is the range of the characteristic impendence of a coaxial cable?

(a) Between 100Ω to 150Ω (b) Between 0Ω to 50Ω
(c) Between 50Ω to 70Ω (d) Between 150Ω to 600Ω

Ans. (c)

(25) The capacitance of an isolated conducting sphere of radius R is proportional to ……

(a) R (b) R^{-2} (c) R^2 (d) R^{-1}

Ans. (a)

(26) Two plates are 20 cm apart and the potential difference between them is 10 volts. The electric field between the plates is …….

(a) 20 Vm^{-1} (b) 0.5 Vm^{-1} (c) 500 Vm^{-1} (d) 50 Vm^{-1}

Ans. (d)

(27) The electric field at the centroid of an equilateral triangle carrying an equal charge q at each of the vertices is ……

(a) $\frac{3kq}{r^2}$ (b) $\frac{kq}{\sqrt{2}\,r^2}$ (c) $\frac{\sqrt{2}\,kq}{r^2}$ (d) zero

Ans. (d)

(28) The energy of a charged capacitor is u. Another identical capacitor is connected parallel to the first capacitor, after disconnecting the battery. The total energy of the system of these capacitors will be …….

(a) $\frac{3u}{4}$ (b) $\frac{3u}{2}$ (c) $\frac{u}{2}$ (d) $\frac{u}{4}$

Ans. (c)

(29) The relation between the intensity of the electric field of an electric dipole at a distance 'r' from its centre on its axis and the distance 'r' is ……

(a) $E\alpha\frac{1}{r^3}$ (b) $E\alpha\frac{1}{r^4}$ (c) $E\alpha\frac{1}{r^2}$ (d) $E\alpha\frac{1}{r}$

Ans. (a)

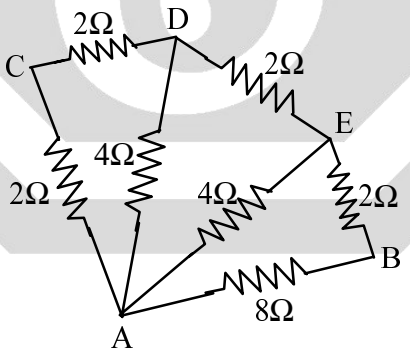
(30) Out of two copper spheres of the same size, x is hollow while y is solid. If they are charged at the same potential, what can be said about the charges on them?

(a) Sphere x will have more charge (b) Sphere y will have more charge

(c) Charge on both the spheres is equal (d) Charge on both the spheres is zero

Ans. (c)

(31) What is the equivalent resistance between A and B in the given circuit?



(a) $\frac{3}{8}\Omega$ (b) $\frac{8}{3}\Omega$ (c) 2Ω (d) 4Ω

Ans. (b)

(32) A proton, a deuteron and an α-particle with the same kinetic energy enter a region of uniform magnetic field moving at right angles to B. What is the ratio of the radii of their circular paths?

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

Ans. (c)

(33) When current is passed through a circular wire prepared from a long conducting wire,

the magnetic field produced at its centre is B. Now a loop having two turns is prepared from the same wire and the same current is passed through it. The magnetic field at its centre will be …..

(a) 16B (b) $\frac{B}{2}$ (c) $\frac{B}{4}$ (d) 4B

Ans. (d)

(34) Two electric bulbs have ratings respectively of 25W, 220V and 100W, 220V. If the bulbs are connected in series with a supply of 440V, which bulb will fuse?

(a) None of these (b) Both of these (c) 100W bulb (d) 25W bulb

Ans. (d)

(35) The neutral temperature of $t_n = 285^oC$ is constant for a Cu-Fe thermocouple. When the cold junction is at 0^oC, the value of inversion temperature is $t_i = 570^oC$, but if the cold junction is at 10^oC, the inversion temperature (t_i) will be …..

(a) 580^oC (b) 570^oC (c) 560^oC (d) 550^oC

Ans. (c)

(36) The unit of magnetic moment is ……

(a) Am^{-1} (b) Am^{-2} (c) JT^{-1} (d) TJ^{-1}

Ans. (c)

(37) Two similar cells, whether joined in series or in parallel, have the same current through an external resistance of 2Ω. The internal resistance of each cell is ……..

(a) 1.5Ω (b) 0.5Ω (c) 2Ω (d) 1Ω

Ans. (c)

(38) Energy required to establish a current of 4A in a coil of self inductance L = 200 mH is ……..

(a) 1.6 J (b) 0.40 J (c) 0.18 J (d) 0.16 J

Ans. (a)

(39) The quantity that remains unchanged in the output with respect to the input in an ideal transformer is ……..

(a) voltage (b) frequency (c) current (d) none of these

Ans. (b)

(40) A resistor of R = 6Ω, an inductor of L = 1H and a capacitor of C = 17.36 μF are connected in series with an A.C. source. Find the Q-factor.

(a) 80 (b) 2.37 (c) 40 (d) 3.72

Ans. (c)