

QB365 Question Bank Software Study Materials

Magnetism and Magnetic Effects of Electric Current 50 Important 1 Marks Questions With Answers (Book Back and Creative)

12th Standard

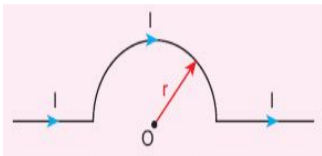
Physics

Total Marks : 50

Multiple Choice Question

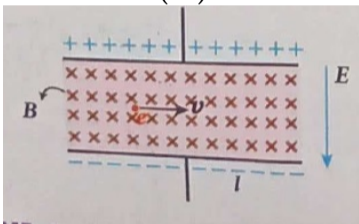
50 x 1 = 50

- 1) The magnetic field at the centre O of the following current loop is



- (a) $\frac{\mu_0 I}{4r} \otimes$ (b) $\frac{\mu_0 I}{4r} \odot$ (c) $\frac{\mu_0 I}{2r} \otimes$ (d) $\frac{\mu_0 I}{2r} \odot$

- 2) An electron moves in a straight line inside a charged parallel plate capacitor of uniform charge density σ . The time taken by the electron to cross the parallel plate capacitor undeflected when the plates of the capacitor are kept under constant magnetic field of induction (\vec{B}) is



- (a) $\varepsilon_0 \frac{e l B}{\sigma}$ (b) $\varepsilon_0 \frac{l B}{\sigma l}$ (c) $\varepsilon_0 \frac{l B}{e \sigma}$ (d) $\varepsilon_0 \frac{l B}{\sigma}$

- 3) A particle having mass m and charge q accelerated through a potential difference V. Find the force experienced when it is kept under perpendicular magnetic field \vec{B} .

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

- 4) A circular coil of radius 5 cm and 50 turns carries a current of 3 ampere. The magnetic dipole moment of the coil is nearly ____.

- (a) 1.0 A m² (b) 1.2 A m² (c) 0.5 A m² (d) 0.8 A m²

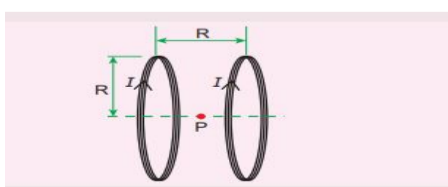
- 5) A thin insulated wire forms a plane spiral of N = 100 tight turns carrying a current I = 8 m A (milli ampere). The radii of inside and outside turns are a = 50 mm and b = 100 mm respectively. The magnetic induction at the centre of the spiral is ____.

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

- 6) 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

- 7) Two identical coils, each with N turns and radius R are placed coaxially at a distance R as shown in the figure. If I is the current passing through the loops in the same direction, then the magnetic field at a point P at a distance of R/2 from the centre of each coil is ____.

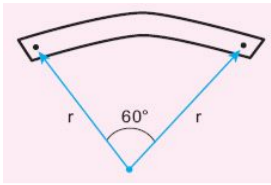


- (a) $\frac{8N\mu_0 I}{\sqrt{5}R}$ (b) $\frac{8N\mu_0 I}{5^{3/2}R}$ (c) $\frac{8N\mu_0 I}{5R}$ (d) $\frac{4N\mu_0 I}{\sqrt{5}R}$

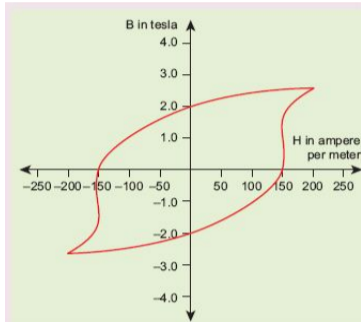
- 8) A wire of length l carrying a current I along the Y direction is kept in a magnetic field is given by $\vec{B} = \frac{\beta}{\sqrt{3}} = (\hat{i} + \hat{j} + \hat{k})T$. The magnitude of Lorentz force acting on the wire is ____.

- (a) $\sqrt{\frac{2}{3}}\beta I l$ (b) $\sqrt{\frac{1}{3}}\beta I l$ (c) $\sqrt{2}\beta I l$ (d) $\sqrt{\frac{1}{9}}\beta I l$

- 9) A bar magnet of length l and magnetic moment p_m is bent in the form of an arc as shown in Figure. The new magnetic dipole moment will be

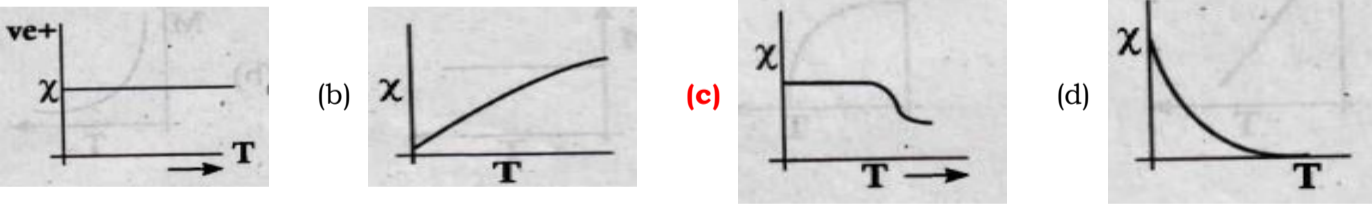
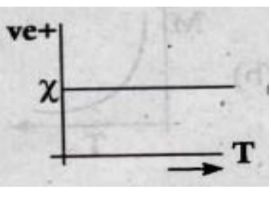
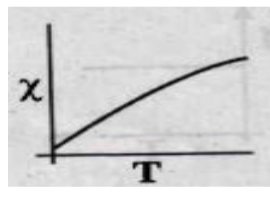
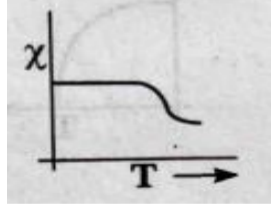
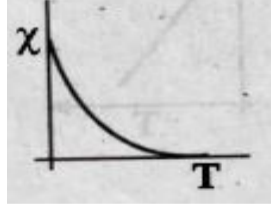


- (a) p_m (b) $\frac{3}{\pi}p_m$ (c) $\frac{2}{\pi}p_m$ (d) $\frac{1}{2}p_m$
- 10) A non-conducting charged ring carrying a charge of q , mass m and radius r is rotated about its axis with constant angular speed ω . Find the ratio of its magnetic moment with angular momentum is _____.
- (a) $\frac{q}{m}$ (b) $\frac{2q}{m}$ (c) $\frac{q}{2m}$ (d) $\frac{q}{4m}$
- 11) The BH curve for a ferromagnetic material is shown in the figure. The material is placed inside a long solenoid which contains 1000 turns/cm. The current that should be passed in the solenoid to demagnetize the ferromagnet completely is _____.



- (a) 1.00 mA (b) 1.25 mA (c) 1.50 mA (d) 1.75 mA
- 12) 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 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 centres is (Horizontal components of Earth's magnetic induction is $3.6 \times 10^{-5} \text{ Wb m}^{-2}$)
- (a) $3.60 \times 10^{-5} \text{ Wb m}^{-2}$ (b) $3.5 \times 10^{-5} \text{ Wb m}^{-2}$ (c) $2.56 \times 10^{-4} \text{ Wb m}^{-2}$ (d) $2.2 \times 10^{-4} \text{ Wb m}^{-2}$
- 13) 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) 30° (b) 45° (c) 60° (d) 90°
- 14) 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) $\frac{1}{2}\sigma\omega\pi BR^2$ (c) $\frac{1}{4}\sigma\omega\pi BR^3$ (d) $\frac{1}{4}\sigma\omega\pi BR^4$
- 15) The potential energy of magnetic dipole whose dipole moment is $\vec{p}_m = (-0.5\hat{i} + 0.4\hat{j}) \text{ Am}^2$ kept in uniform magnetic field $\vec{B} = 0.2\hat{i} \text{ T}$.
- (a) -0.1 J (b) -0.8 J (c) 0.1 J (d) 0.8 J
- 16) The unit of magnetic field is _____.
- (a) ampere-turn (b) ampere (c) newton coulomb (d) tesla
- 17) The deflection in a galvanometer falls from 50 to 20 divisions when 12Ω shunt is applied. The galvanometer resistance is _____.
- (a) 18Ω (b) 36Ω (c) 24Ω (d) 30Ω
- 18) Two thin long parallel wires separated by a distance are carrying current 1 amp each. The magnitude of the force per unit length excited by one wire on the other is _____.
- (a) $\frac{\mu_0 I^2}{a^2}$ (b) $\frac{\mu_0 I^2}{2\pi a}$ (c) $\frac{\mu_0 I}{2\pi a}$ (d) $\frac{\mu_0 I}{2\pi a^2}$
- 19) A galvanometer coil has a resistance of 15Ω and gives full-scale deflection for a current of 4mA . To convert it to an ammeter of range 0 to 6 amp _____.

- (a) $10\text{m}\Omega$ resistance is to be connected in parallel to the galvanometer
 (b) $10\text{m}\Omega$ resistance is to be connected in series with the galvanometer
 (c) $0.1\text{m}\Omega$ resistance is to be connected in series with the galvanometer
(d) $0.1\text{m}\Omega$ resistance is to be connected in parallel to the galvanometer
- 20) At a given place the horizontal component of the earth's field is 0.2×10^{-4} Tesla. If a vertical wire carries a current of 30A upward, what is the magnitude and direction of the force on 1m of wire?
(a) 6 East to West (b) 6×10^{-2} East to West (c) 6×10^{-3} East to West (d) 6×10^{-4} East to West
- 21) According to Joule's heating effects the law of current is _____.
 (a) $I \propto H^2$ (b) $H \propto I^2$ (c) $\frac{H}{I^2}$ **(d) both (b) and (c)**
- 22) According to Joule's heating effect the law of resistance is _____.
(a) $H \propto R$ (b) $H \propto R^2$ (c) $R \propto H^2$ (d) all the above
- 23) In which one of the following heating effect to current is undesirable?
 (a) electric iron **(b) electric motor** (c) fuse wire (d) electric bulb
- 24) Melting point of tungsten is about heating element _____.
 (a) 3830°C (b) 2380°C **(c) 3380°C** (d) 3803°C
- 25) In which of the following pairs of metals of the thermocouple, the emf is maximum?
 (a) Fe-Cu (b) Cu-Zn (c) Pt-Ag **(d) Sb-Bi**
- 26) When the hot and cold junctions of a thermo couple are interchanged then the thermo emf _____.
 (a) increases **(b) remain unchanged** (c) decreases (d) increases or decreases according to nature of metals used
- 27) In a thermocouple, the temperature of cold junction is 30°C and the neutral temperature is 310°C . The temperature of inversion is _____.
 (a) 580°C **(b) 590°C** (c) 600°C (d) 690°C
- 28) Which one of the following pair of particles move with same velocity along the same circular path in a uniform magnetic field?
 (a) electron, proton (b) proton, deuteron (c) proton, alpha particle **(d) deuteron, alpha particle**
- 29) 1 water = _____.
 (a) 10^6 maxwell (b) 10^7 maxwell **(c) 10^8 maxwell** (d) 10^5 maxwell
- 30) A current of 2A flows through a circular coil of area $4\pi \times 10^{-2} \text{ m}^2$. The magnetic field at the centre of the coil is _____.
 (a) $62.8 \times 10^{-6}\text{T}$ (b) $628 \times 10^{-6}\text{T}$ **(c) $6.28 \times 10^{-6}\text{T}$** (d) $3.14 \times 10^{-6}\text{T}$
- 31) Two parallel wires carrying same current in the opposite direction will experience _____.
 (a) an attractive (b) magnetic force (c) electric force **(d) repulsive force**
- 32) To convert a galvanometer into an ammeter we connect which one of the following to the galvanometer?
 (a) a low resistance in series (b) a high resistance in series **(c) a low resistance in parallel**
 (d) a high resistance in parallel
- 33) The unit of water equivalent is _____.
(a) $\frac{J}{K}$ (b) $\frac{J}{M}$ (c) $\frac{J}{kg}$ (d) $\frac{J}{kg.K}$
- 34) Above the neutral temperature the thermo emf _____.
(a) changes sign (b) is constant (c) increases with the rise in temperature (d) decrease with the rise in temperature

- 35) Which of the following principle is used in a thermopile?
 (a) Thomson effect (b) Peltier effect **(c) Seebeck effect** (d) Joules effect
- 36) The elements having Thomson positive effect are _____
 (a) Sb, Hg, Zn (b) Ag, Hg, Cd **(c) Zn, Cd, Sb** (d) Cd, Pt, Ag
- 37) To draw thermo electric diagrams Lead is used as one of the metals to form a thermo couple with other metal because _____
 (a) It is a hard metal (b) It has high nuclear density (c) It does not allow X-rays **(d) It has zero Thomson effect**
- 38) The force on a proton moving with a speed of 10^5 m/s perpendicular to a magnetic field 10^{-3} tesla is _____
(a) 1.6×10^{-17} N (b) 1.6×10^{-27} N (c) 1.6×10^{-19} N (d) 10^{-2} N
- 39) If a proton and a deuteron move in a magnetic field along the same circular path, then the ratio of their velocities is _____
 (a) 1:1 (b) 4:1 (c) 1:2 **(d) 2:1**
- 40) A deuteron and an alpha particle move in a magnetic field along the same circular path, then the ratio of their velocities is _____
 (a) 1:2 (b) 2:1 (c) 4:1 **(d) 1:1**
- 41) If a deuteron and an alpha particle move perpendicular to a uniform magnetic field with same velocity, then the ratio of the radii of their path is _____
(a) 1:1 (b) 1:2 (c) 2:1 (d) 4:1
- 42) No current flows between two charged particles when connected if they have same _____
 (a) capacity **(b) potential** (c) charge (d) none of these
- 43) If the galvanometer constant is 0.15 A rad^{-1} , then the deflection for a current of 10 mA is about _____.
(a) 6° (b) 0.1° (c) 1° (d) 3°
- 44) The voltage sensitivity of a galvanometer can be increased by _____
 (a) increasing the current (b) increasing the couple per unit twist of the suspension wire
 (c) increasing the number of turns of the coil **(d) increasing the magnetic induction**
- 45) One tesla is equivalent to _____.
 (a) weber (b) Am (c) Am^2 **(d) weber m^{-2}**
- 46) Which of the following graphs indicate the variation of magnetic susceptibility with absolute temperature of a ferromagnetic substance?

 (a)  (b)  **(c)**  (d) 
- 47) Select the odd one out.
 (a) permeability (b) magnetic field (c) magnetic displacement **(d) electric dipole moment**
- 48) Cyclotron cannot accelerate _____.
 (a) proton (b) α -particle (c) deuteron **(d) electron**
- 49) The expression for magnetic induction (B) at the centre of a current (I) carrying circular loop is _____.
 (a) $\frac{\mu r}{2I}$ **(b) $\frac{\mu I}{2r}$** (c) $\frac{\mu I r}{2}$ (d) $\frac{2\mu}{Ir}$
- 50) An electron is moving in a circular path under the influence of a transverse magnetic field of 3.57×10^{-2} T. If the value of e/m is $1.76 \times 10^{11} \text{ C kg}^{-1}$. The frequency of the revolution of the electron is

(a) **1 GHz** (b) 100 MHz (c) 62.8 MHz (d) 6.28 MHz