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Effects Magnetic and Magnetism about Worksheet الملف

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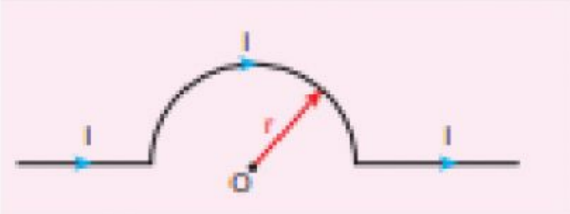
UNIT - 3 Magnetism and magnetic effects of electric current

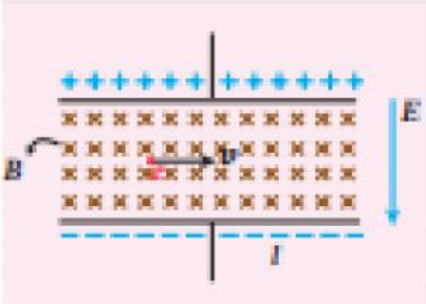
The magnetic field at the centre O of the following current loop is



(a) $\frac{\mu_0 I}{4r} \otimes$ (b) $\frac{\mu_0 I}{4r} \odot$

(c) $\frac{\mu_0 I}{2r} \otimes$ (d) $\frac{\mu_0 I}{2r} \odot$

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) $\varepsilon_0 \frac{elB}{\sigma}$ (b) $\varepsilon_0 \frac{lB}{\sigma l}$

(c) $\varepsilon_0 \frac{lB}{e\sigma}$ (d) $\varepsilon_0 \frac{lB}{\sigma}$

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) $\sqrt{\frac{2q^3BV}{m}}$ (b) $\sqrt{\frac{q^3B^2V}{2m}}$

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

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 m^2 (b) 1.2 A m^2

(c) 0.5 A m^2 (d) 0.8 A m^2

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

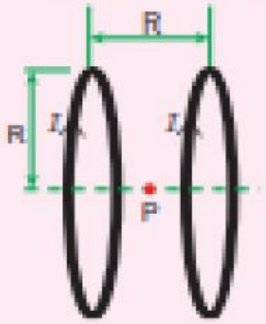
(c) 8 μT (d) 10 μT

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

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) $\frac{4N\mu_0 I}{\sqrt{5}R}$

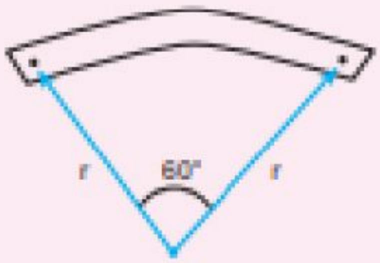
. A wire of length l carrying a current I along the Y direction is kept in a magnetic field given by $\vec{B}=\frac{\beta}{\sqrt{3}}(\hat{i}+\hat{j}+\hat{k})T$. The magnitude of Lorentz force acting on the wire is

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

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

. 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

(NEET 2013)



(a) p_m (b) $\frac{3}{\pi}p_m$

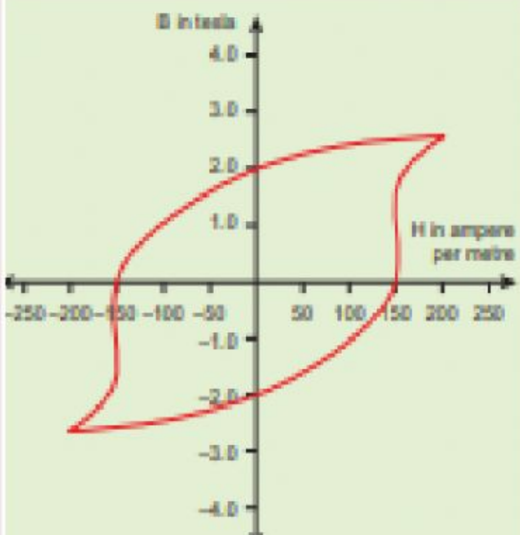
(c) $\frac{2}{\pi}p_m$ (d) $\frac{1}{2}p_m$

0. 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) $\frac{q}{4m}$

1. 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 solenonid to demagnetize the ferromagnet completely is



(a) 1.00 m A (b) 1.25 mA

(c) 1.50 mA (d) 1.75 mA

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 3.6×10^{-5} Wb m^{-2})

(NSEP 2000-2001)

(a) 3.60×10^{-5} Wb m^{-2}

(b) 3.5×10^{-5} Wb m^{-2}

(c) 2.56×10^{-4} Wb m^{-2}

(d) 2.2×10^{-4} Wb m^{-2}

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°

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 centre 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) $\frac{1}{4}\sigma\omega\pi BR^4$

The potential energy of magnetic dipole whose dipole moment is $\vec{p}_m = (-0.5\hat{i} + 0.4\hat{j})$ Am^2 kept in uniform magnetic field $\vec{B} = 0.2\,\hat{i}$ T

(a) -0.1 J (b) -0.8 J

(c) 0.1 J (d) 0.8 J