CBSE NCERT Based Chapter wise Questions (2025-2026)

Class-XII

Subject: Physics

Chapter Name : Magnetic Effect of Current (Chap : 4)

Total : 6 Marks (expected) [MCQ(2)-2, Assertion-Reason-(1)-2, SA-II(1)-2 Marks, VSA-II(1)-3 Marks]

Level - 2

MCQ Type :

1. Which of the following is correct for the points outside the wire or beam?

Ⓐ A current-carrying wire produces magnetic field but not electric field

Ⓑ A current-carrying wire produces both magnetic field and electric field

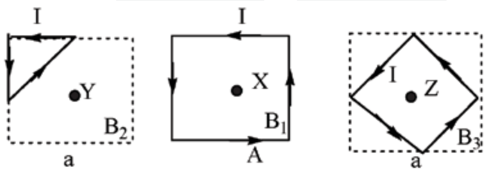
Ⓒ A proton beam moving with some velocity produces only electric field

Ⓓ A proton beam moving with some velocity produces only magnetic field

2. Two parallel, long wires carry currents i_1 and i_2 with $i_1 > i_2$. When the current are in the same direction, the magnetic field at a point midway between the wire is 10 mT. If the direction of i_2 is reversed, the field becomes 30 mT. The ratio i_1/i_2 is

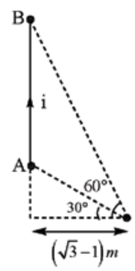
Ⓐ 4 Ⓑ 3 Ⓒ 2 Ⓓ 1

3. Consider following coils each of one turn carrying current I. The magnitude of the magnetic induction at X, Y, Z are B_1, B_2 and B_3 respectively. Then (assume side of square to be same in each case)



Ⓐ $B_3 > B_1 > B_2$ Ⓑ $B_2 > B_3 > B_1$ Ⓒ $B_2 > B_1 > B_3$ Ⓓ $B_1 > B_2 > B_3$

4. A straight wire current element is carrying current 100 A, as shown in figure. The magnitude of magnetic field at point P which is at perpendicular distance $\left(\sqrt{3}-1\right)m$ from the current element if end A and end B of the element subtend angle 30° and 60° at point P, as shown, is



Ⓐ $5 \times 10^{-6} T$ Ⓑ $2.5 \times 10^{-6} T$

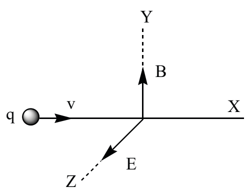
Ⓒ $2.5 \times 10^{-5} T$ Ⓓ $8 \times 10^{5} T$

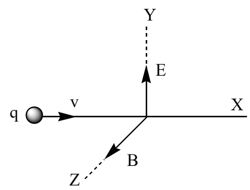
5. B_1 is the magnetic field due to bigger coil, B_2 is the magnetic field due to smaller coil and B_{net} is the net magnetic field at the center of two concentric coils. If $B_{net} < B_1$ and $B_2 < B_1$, then decide the direction of currents I_1 and I_2 in the two coils

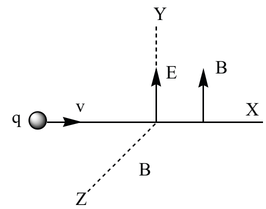
Ⓐ Both clockwise Ⓑ Both anticlockwise

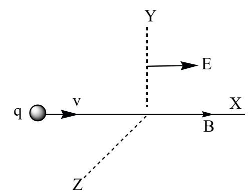
Ⓒ Both opposite to each other Ⓓ It can't be predicted

6. A particle of charge q and mass m is moving along the x-axis with a velocity v and enters a region of electric field E and magnetic field B as shown in figure below for which figure the net force on the charge may be zero

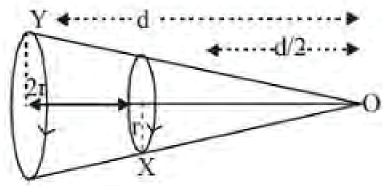
Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

7. Two circular X and Y, having equal number of turns, carry equal currents in the same sense and subtend same solid angle at point O. If the smaller coil X is midway between O and Y, and if we represent the magnetic induction due to bigger coil Y at O as BY and that due to smaller coil X at O as B_X, then



Ⓐ $\frac{B_y}{B_x}=1$ Ⓑ $\frac{B_y}{B_x}=2$ Ⓒ $\frac{B_y}{B_x}=\frac{1}{2}$ Ⓓ $\frac{B_y}{B_x}=\frac{1}{4}$

8. Two wires of same length are shaped into a square and a circle. If they carry same current, ratio of the magnetic moment is

Ⓐ $2:\pi$ Ⓑ $\pi:2$ Ⓒ $\pi:4$ Ⓓ $4:\pi$

9. A steady current I goes through a wire loop PQR having shape of a right angle triangle with $PQ = 3x$, $PR = 4x$ and $QR = 5x$. The magnitude of the magnetic field at P due to this loop is

Ⓐ $\frac{7\mu_0 I}{48\pi x}$ Ⓑ $\frac{48\mu_0 I}{7\pi x}$ Ⓒ $\frac{\mu_0 I}{\pi x}$ Ⓓ $\frac{9\mu_0 I}{\pi x}$

10. Two identical conducting wires AOB and COD are placed at right angles to each other. The wire AOB carries an electric current I_1 and COD carries a current I_2. The magnetic field on a point lying at a distance d from O, in a direction perpendicular to the plane of the wires AOB and COD, will be given by

Ⓐ $\frac{\mu_0}{2\pi d}\left(I_1^2+I_2^2\right)$ Ⓑ $\frac{\mu_0}{2\pi}\left(\frac{I_1+I_2}{d}\right)^{\frac{1}{2}}$ Ⓒ $\frac{\mu_0}{2\pi d}\left(I_1^2+I_2^2\right)^{\frac{1}{2}}$ Ⓓ $\frac{\mu_0}{2\pi d}\left(I_1+I_2\right)$

Very Short Answer Questions :

1. Write any two points of similarities and dissimilarities between coulomb's law of electrostatic field and Biot–Savart's Law of magnetic field.
2. Find the condition under which the charged particles moving with different speeds in the presence of electric and magnetic field vectors can be used to select charged particles of a particular speed.
3. what is meant by current sensitivity of a galvanometer? Mention the factors on which it depends.
4. A hydrogen ion of mass m and charge q travels with a speed v along a circle of radius r in a uniform magnetic field of flux density B. Obtain the expression for the magnetic force on the ion and determine its time period.

Short Answer Questions :

1. A galvanometer with a coil of resistance 12Ω shows full scale deflection for a current 2.5 mA. How will you convert the meter into :

   (a) an ammeter of range 0 to 7.5 A
   (b) a voltmeter of range 0 to 10.0 v
2. A circular coil with cross sectional area 0.2 cm2 carries a current of 4A. It is kept in a uniform magnetic field of magnitude 0.5T normal to the plane to the coil.

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Calculate –

(a) the net force on the coil

(b) the torque on he coil

3. A conductor of length 10 cm is placed perpendicular to a uniform magnetic field of strength 100 oersted. If a charge of 5c passes through it in 5s, find the force experienced by the conductor.

4. An electron entering a magnetic field of 10^{-2} T with a velocity of 10^{7} ms^{-1} describes a circle of radius 6×10^{-3} m. Calculate $\frac{1}{m}$ of the electron.

ANSWER

MCQs

1. Ⓐ	3. Ⓐ	5. Ⓒ	7. Ⓒ	9. Ⓐ
2. Ⓒ	4. Ⓐ	6. Ⓑ	8. Ⓒ	10. Ⓒ

1. (i) $4.0 \times 10^{-3}\Omega$ converted in parallel (ii) 3988Ω in series

2. (i) 0 (ii) 0

3. 10^{-3} N

3. 1.67×10^{11} C kg^{-1}

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