

PYQSide

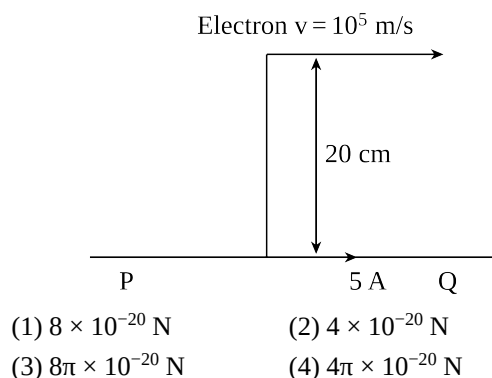
NEET MOVING CHARGES AND MAGNETISM — MAGNETIC FORCE ON A MOVING CHARGE (LORENTZ FORCE) — PYQS

Max. Marks: 32

Questions: 8

Section A (MCQ)

- Q.1** An infinitely long straight conductor carries a current of 5 A as shown. An electron is moving with a speed of 10^5 m/s parallel to the conductor. The perpendicular distance between the electron and the conductor is 20 cm at an instant. Calculate the magnitude of the force experienced by the electron at that instant. [NEET (UG) 2021]



Scan or tap for the full solution



- Q.2** In the product $\vec{F} = q(\vec{v} \times \vec{B})$
 $= q\vec{v} \times (\hat{B}_i + \hat{B}_j + B_0\hat{k})$
 For $q = 1$ and $\vec{v} = 2\hat{i} + 4\hat{j} + 6\hat{k}$ and $\vec{F} = 4\hat{i} - 20\hat{j} + 12\hat{k}$
 What will be the complete expression for $\vec{B}$?

- [NEET (UG) 2021]
- (1) $6\hat{i} + 6\hat{j} - 8\hat{k}$ (2) $-8\hat{i} - 8\hat{j} - 6\hat{k}$
(3) $-6\hat{i} - 6\hat{j} - 8\hat{k}$ (4) $8\hat{i} + 8\hat{j} - 6\hat{k}$

Scan or tap for the full solution



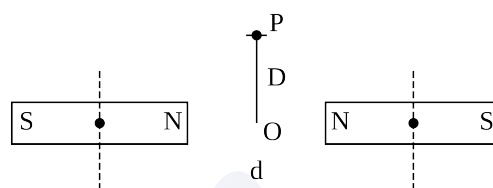
- Q.3** A long straight wire carries a certain current and produces a magnetic field 2×10^{-4} Wb m^{-2} at a perpendicular distance of 5 cm from the wire. An electron situated at 5 cm from the wire moves with a velocity 10^7 m/s towards the wire along perpendicular to it. The force experienced by the electron will be (charge on electron 1.6×10^{-19} C)

- [NEET 2013 (Karnataka)]
- (1) 3.2 N (2) 3.2×10^{-16} N
(3) 1.6×10^{-16} N (4) zero

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- Q.4** Two identical bar magnets are fixed with their centers at a distance d apart. A stationary charge Q is placed at P in between the gap of the two magnets at a distance D from the centre O as shown in the figure



The force on the charge Q is [AIPMT 2010 (Mains)]

- (1) zero
(2) directed along OP
(3) directed along PO
(4) directed perpendicular to the plane of paper

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- Q.5** The magnetic force acting on a charged particle of charge $-2 \mu\text{C}$ in a magnetic field of 2 T acting in y direction, when the particle velocity is $(2\hat{i} + 3\hat{j}) \times 10^6 \text{ m s}^{-1}$, is [AIPMT 2009]
- (1) 4 N in z direction (2) 8 N in y direction
(3) 8 N in z direction (4) 8 N in $-z$ direction

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- Q.6** When a charged particle moving with velocity $\vec{v}$ is subjected to a magnetic field of induction $\vec{B}$, the force on it is non-zero. This implies that

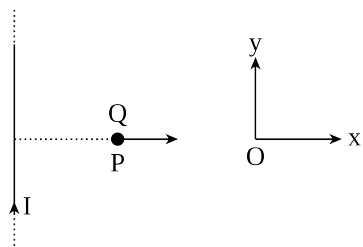
[AIPMT 2006]

- (1) angle between $\vec{v}$ and $\vec{B}$ is either zero or 180°
(2) angle between $\vec{v}$ and $\vec{B}$ is necessarily 90°
(3) angle between $\vec{v}$ and $\vec{B}$ can have any value other than 90°
(4) angle between $\vec{v}$ and $\vec{B}$ can have any value other than zero and 180°

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- Q.7** A very long straight wire carries a current I . At the instant when a charge $+Q$ at point P has velocity $\vec{v}$, as shown, the force on the charge is [AIPMT 2005]



- (1) along Oy (2) opposite to Oy
(3) along Ox (4) opposite to Ox

Scan or tap for the
full solution



Q.8 A charge q moves in a region where electric field and magnetic field both exist, then force on it is

[AIPMT 2002]

- (1) $q(\vec{v} \times \vec{B})$ (2) $q\vec{E} + q(\vec{v} \times \vec{B})$
(3) $q\vec{E} + q(\vec{B} \times \vec{v})$ (4) $q\vec{B} + q(\vec{E} \times \vec{v})$

Scan or tap for the
full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7	8			
Ans.	1	3	2	1	4	4	1	2			