JEE

Prayas JEE (2025)

Physics

Magnetism

DPP: 5

Q1 A proton, a deutron and an α-particle with the same KE enter a region of uniform magnetic field, moving at right angle to B. What is the ratio of the radius of their circular paths?
(A) $1:\sqrt{2}:1$
(B) $1:\sqrt{2}:\sqrt{2}$
(C) $\sqrt{2}:1:1$
(D) $\sqrt{2}:\sqrt{2}:1$

Q2 A charged particle moves along a circle under the action of possible constant electric and magnetic fields. Which of the following are possible?
(A) $E=0, B=0$
(B) $E=0, B\neq 0$
(C) $E\neq 0, B=0$
(D) $E\neq 0, B\neq 0$

Q3 An electron is moving along positive x-axis. To get it moving on an anticlockwise circular path in $x-y$ plane, a magnetic field is applied
(A) Along positive y-axis
(B) Along positive z-axis
(C) Along negative y-axis
(D) Along negative z-axis

Q4 A charged particle moves with velocity $\vec{v}=a\hat{i}+d\hat{j}$ in a magnetic field $\vec{B}=A\hat{i}+D\hat{j}$. The force acting on the particle has magnitude F. Then,
(A) $F=0$, if $aD=dA$
(B) $F=0$, if $aD=-dA$
(C) $F=0$, if $aA=dD$
(D) $F\propto\left(a^2+b^2\right)^{1/2}\times\left(A^2+D^2\right)^{1/2}$

Q5 Two charged particles are projected into a region in which a magnetic field is perpendicular to their velocities. After they enter the magnetic field, you can conclude that
(A) The charges are deflected in opposite directions
(B) The charges continue to move in a straight line
(C) The charges move in circular paths
(D) The charges move in circular paths but in opposite directions

Q6 Two particles A and B of masses m_A and m_B respectively and having the same charge are moving in a plane. A uniform magnetic field exists perpendicular to this plane. The speeds of the particles are v_A and v_B respectively and the trajectories are as shown in the figure. Then

(A) $\mathrm{m_A\ v_A} < \mathrm{m_B\ v_B}$
(B) $\mathrm{m_A\ v_A} > \mathrm{m_B\ v_B}$
(C) $\mathrm{m_A} < \mathrm{m_B}$ and $\mathrm{v_A} < \mathrm{v_B}$
(D) $\mathrm{m_A} = \mathrm{m_B}$ and $\mathrm{v_A} = \mathrm{v_B}$

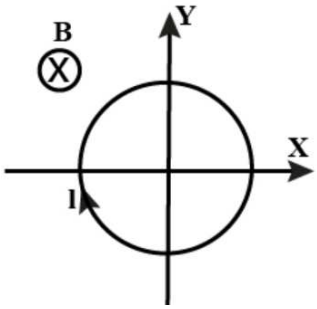
Q7 A charge particle is released from rest in a region of steady and uniform electric and magnetic field

which are parallel to each other. The particle will move in a

(A) Straight line (B) Circle

(C) Helix (D) Cycloid

Q8 A conducting loop carrying a current I is placed in a uniform magnetic field pointing into the plane of the paper as shown. The loop will have a tendency to



(A) contract

(B) expand

(C) move towards +ve x-axis

(D) move towards -ve x-axis

Q9 An electron and a proton enter a magnetic field perpendicularly. Both have same kinetic energy. Which of the following is true?

(A) Trajectory of electron is less curved

(B) Trajectory of proton is less curved

(C) Both trajectories arc equally curved

(D) Both more on straight line path

Q10 A proton moving with a constant velocity passes through a region of space without any change in its velocity. If $\vec{E}$ and $\vec{B}$ represent the electric and magnetic fields respectively, then this region of space may have

(A) $\mathrm{E} = 0,\ \mathrm{B} = 0$

(B) $\mathrm{E} = 0,\ \mathrm{B} \neq 0$

(C) $\mathrm{E} \neq 0,\ \mathrm{B} = 0$

(D) $\mathrm{E} \neq 0,\ \mathrm{B} \neq 0$

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Answer Key

Q1	(A)	Q6	(B)
Q2	(B)	Q7	(A)
Q3	(B)	Q8	(B)
Q4	(A)	Q9	(B)
Q5	(C)	Q10	(C)

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