

NEET MOVING CHARGES AND MAGNETISM — MOTION OF A CHARGE IN A MAGNETIC FIELD — PYQS

Max. Marks: 44

Questions: 11

Section A (MCQ) — 11 questions

- Q.1** A model for quantized motion of an electron in a uniform magnetic field B states that the flux passing through the orbit of the electron is $n(h/e)$ where n is an integer, h is Planck's constant and e is the magnitude of electron's charge. According to the model, the magnetic moment of an electron in its lowest energy state will be (m is the mass of the electron)

[NEET (UG) 2025]

- (1) $\frac{heB}{\pi m}$ (2) $\frac{heB}{2\pi m}$ (3) $\frac{he}{\pi m}$ (4) $\frac{he}{2\pi m}$

Scan or tap for the full solution



- Q.2** Ionized hydrogen atoms and α -particles with same momenta enter perpendicular to a constant magnetic field, B . The ratio of their radii of their paths $r_H:r_\alpha$ will be :

[NEET (UG) 2019]

- (1) 1:2 (2) 4:1 (3) 1:4 (4) 2:1

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- Q.3** 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 1.76×10^{11} C kg⁻¹, the frequency of revolution of the electron is

[NEET 2016 (Phase 2)]

- (1) 1 GHz (2) 100 MHz
(3) 62.8 MHz (4) 6.28 MHz

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- Q.4** A proton and an alpha particle both enter a region of uniform magnetic field B , moving at right angles to the field B . If the radius of circular orbits for both the particles is equal and the kinetic energy acquired by proton is 1 MeV, the energy acquired by the alpha particle will be

[AIPMT 2015]

- (1) 1.5 MeV (2) 1 MeV
(3) 4 MeV (4) 0.5 MeV

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- Q.5** A proton carrying 1 MeV kinetic energy is moving in a circular path of radius R in uniform magnetic field. What should be the energy of an α -particle to describe a circle of same radius in the same field?

[AIPMT 2012 (Mains)]

- (1) 2 MeV (2) 1 MeV
(3) 0.5 MeV (4) 4 MeV

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- Q.6** Under the influence of a uniform magnetic field, a charged particle moves with constant speed v in a circle of radius R . The time period of rotation of the particle

[AIPMT 2009]

- (1) depends on R and not on v
(2) is independent of both v and R
(3) depends on both v and R
(4) depends on v and not on R

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- Q.7** A particle of mass m , charge Q and kinetic energy T enters a transverse uniform magnetic field of induction $\vec{B}$. After 3 seconds the kinetic energy of the particle will be

[AIPMT 2008]

- (1) T (2) $4T$ (3) $3T$ (4) $2T$

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- Q.8** Under the influence of a uniform magnetic field, a charged particle moves with constant speed v in a circle of radius R . The time period of rotation of the particle

[AIPMT 2007]

- (1) depends on R and not on v
(2) is independent of both v and R
(3) depends on both v and R
(4) depends on v and not on R

Scan or tap for the full solution



Q.9 In a mass spectrometer used for measuring the masses of ions, the ions are initially accelerated by an electric potential V and then made to describe semicircular paths of radius R using a magnetic field B . If V and B are kept constant, the ratio $\left(\frac{\text{charge on the ion}}{\text{mass of the ion}}\right)$ will be proportional to

[AIPMT 2007]

- (1) $1/R^2$ (2) R^2 (3) R (4) $1/R$

Scan or tap for the
full solution



Q.10 A charged particle moves through a magnetic field in a direction perpendicular to it. Then the

[AIPMT 2003]

- (1) speed of the particle remains unchanged
(2) direction of the particle remains unchanged
(3) acceleration remains unchanged
(4) velocity remains unchanged

Scan or tap for the
full solution



Q.11 An electron having mass m and kinetic energy E enters a uniform magnetic field B perpendicularly, then its frequency will be

[AIPMT 2001]

- (1) $\frac{eE}{q\sqrt{B}}$ (2) $\frac{2\pi m}{eB}$ (3) $\frac{eB}{2\pi m}$ (4) $\frac{2m}{eBE}$

Scan or tap for the
full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	4	4	1	2	2	2	1	2	1	1	3