

## Force on moving charge in uniform magnetic and electric field CLASS-XII

SUBJECT : PHYSICS CHAPTER NUMBER: 04 CHAPTER NAME : MOVING CHARGES AND MAGNETISM

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Website: www.odmegroup.org Email: info@odmps.org Toll Free: 1800 120 2316

Sishu Vihar, Infocity Road, Patia, Bhubaneswar-751024

## **HOME ASSIGNMENT**

**1.** If a particle of charge q is moving with velocity v along the z-axis and the magnetic field B is acting along the x-axis, use the expression  $\vec{F} = q(\vec{v} \times \vec{B})$  to find the direction of the force F acting on it. A beam of proton passes unelected with a horizontal velocity v, through a region of electric and magnetic fields, mutually perpendicular to each other and normal to the direction of the beam. If the magnitudes of the electric and magnetic fields are 100 kV/m and 50 mT respectively, calculate

(a) velocity v of the beam.

(b) the force with which it strikes a target on a screen if the proton beam cutting is equal to 0.80 mA.

2. A beam of  $\alpha$ -particles projected along +X-axis, experiences a force due to a magnetic field along the + Y-axis. What is the direction of the magnetic field?

- 3. Define one tesla using the expression the magnetic force acting on a particle charge q moving with velocity v in a magnetic field B.
- 4. A proton and an electron travelling along parallel paths enter a region of uniform magnetic field, acting perpendicular to their paths. Which of them will move in a circular path with higher frequency?

5. Two protons of equal kinetic energies enter a region of uniform magnetic field. The first proton enters normal to the field direction while the second enters at 30° to the field direction. Name the trajectories followed by them.



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