

# Cyclotron

## CLASS-XII

**SUBJECT : PHYSICS**

**CHAPTER NUMBER: 04**

**CHAPTER NAME : MOVING CHARGES AND MAGNETISM**

---

**CHANGING YOUR TOMORROW**

---

# Home Assignment

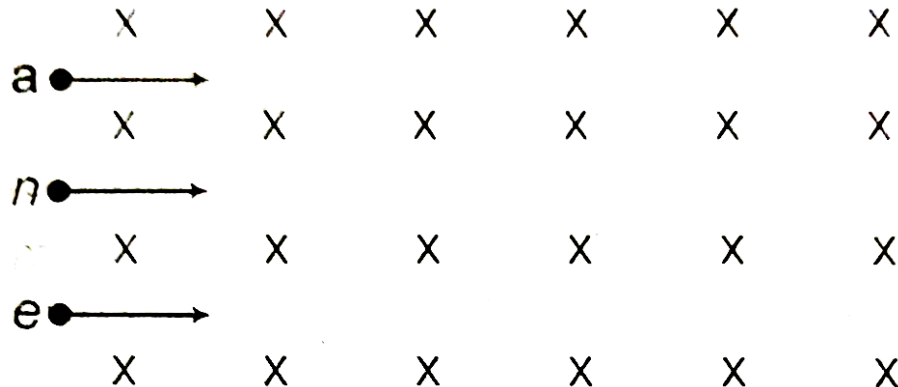
1. A proton is accelerated through a potential difference  $V$ , subjected to a uniform magnetic field acting normal to the velocity of the proton. If the potential difference is doubled, how will the radius of the circular path described by the proton in the magnetic field change?
2. A deuteron and a proton moving with the same speed enter the same magnetic field region at right angles to the direction of the field. Show the trajectories followed by the two particles in the magnetic field. Find the ratio of the radii of the circular paths which the two particles may describe.
3. Draw a schematic sketch of the cyclotron. State its working principle. Show that the cyclotron frequency is independent of the velocity of the charged particle.

## Home Assignment

4. An  $\alpha$ -particle and a proton are released from the centre of the cyclotron and made to accelerate.

- Can both be accelerated at the same cyclotron frequency? Give reason to justify your answer.
- When they are accelerated in turn, which of the two will have higher velocity at the exit slit of the dees?

5. A neutron, an electron and an alpha particle moving with equal velocities, enter a uniform magnetic field going into the plane of the paper as shown in the figure. Trace their paths in the field and justify your answer.



**THANKING YOU**  
**ODM EDUCATIONAL GROUP**