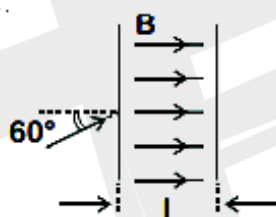


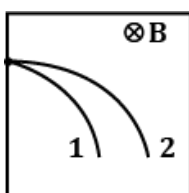
DPP - 1

- Q.1** Two charged particles, having same kinetic energy, are allowed to pass through a uniform magnetic field perpendicular to the direction of motion. If the ratio of radii of their circular paths is 6: 5 and their respective masses ratio is 9: 4. Then, the ratio of their charges will be  $P/q$ . value of  $p + q$  -----
- Q.2** A charge particle is moving in a uniform magnetic field  $(2\hat{i} + 3\hat{j})$  T. If it has an acceleration of  $(\alpha\hat{i} - 4\hat{j})\text{m/s}^2$ , then the value of  $\alpha$  will be
- Q.3** A proton, a deuteron and  $\alpha$ -particle with same kinetic energy enter into a uniform magnetic field at right angle to magnetic field. The ratio of the radii of their respective circular paths is  $K: \frac{P}{\sqrt{2}}: 1$ , then  $p + K$  is equal to
- Q.4** The figure shows a region of length '  $l$  ' with a uniform magnetic field of 0.3 T in it and a proton entering the region with velocity  $4 \times 10^5 \text{ m s}^{-1}$  making an angle  $60^\circ$  with the field. If the proton completes 10 revolution by the time it cross the region shown, '  $l$  ' is close to (mass of proton =  $1.67 \times 10^{-27} \text{ kg}$ , charge of the proton =  $1.6 \times 10^{-19} \text{ C}$ )



- (A) 0.88 m                      (B) 0.22 m                      (C) 0.11 m                      (D) 0.44 m

- Q.5** A charged particle carrying charge  $1\mu\text{C}$  is moving with velocity  $(2\hat{i} + 3\hat{j} + 4\hat{k})\text{ms}^{-1}$ . If an external magnetic field of  $(5\hat{i} + 3\hat{j} - 6\hat{k}) \times 10^{-3} \text{ T}$  exists in the region where the particle is moving, then the force on the particle is  $\vec{F} \times 10^{-9} \text{ N}$ . The vector  $\vec{F}$  is
- (A)  $-0.30\hat{i} + 0.32\hat{j} - 0.09\hat{k}$                       (B)  $-30\hat{i} + 32\hat{j} - 9\hat{k}$   
 (C)  $-300\hat{i} + 320\hat{j} - 90\hat{k}$                       (D)  $-3.0\hat{i} + 3.2\hat{j} - 0.9\hat{k}$
- Q.6** Two charged particles having charges  $q_1$  and  $q_2$  and masses  $m_1$  and  $m_2$  are projected with same velocity in a region of uniform magnetic field. They follow the trajectory as shown in figure : From this, we can conclude that :

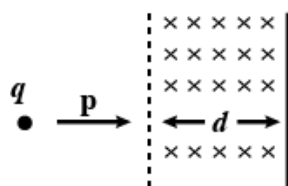


- (A)  $q_1 > q_2$                       (B)  $q_1 < q_2$                       (C)  $m_1 < m_2$                       (D) none of these

(Physics)

MAGNETISM

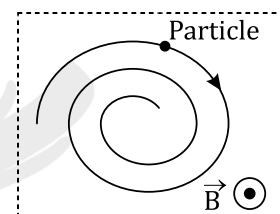
- Q.7** A particle with charge  $Q$ , moving with a momentum  $p$ , enters a uniform magnetic field normally. The magnetic field has magnitude  $B$  and is confined to a region of width  $d$ , where  $d < \frac{p}{BQ}$ . The particle is deflected by an angle  $\theta$  in crossing the field. Then :



- (A)  $\sin \theta = \frac{BQd}{p}$  (B)  $\sin \theta = \frac{p}{BQd}$   
 (C)  $\sin \theta = \frac{Bp}{Qd}$  (D)  $\sin \theta = \frac{pd}{BQ}$

- Q.8** A uniform magnetic field is directed out of the page. A charged particle, moving in the plane of the page, follows a clockwise spiral of decreasing radius as shown. A reasonable explanation is :

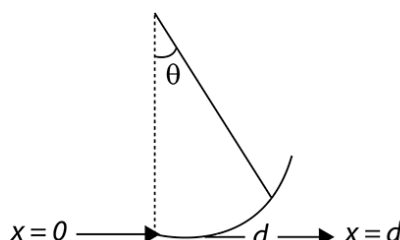
- (A) the charge is positive and slowing down  
 (B) the charge is negative and slowing down  
 (C) the charge is positive and speeding up  
 (D) the charge is negative and speeding up



- Q.9** A charged particle is projected perpendicular to a uniform magnetic field. Its path is as shown number eight. The frequency of reversal of direction of magnetic field if mass of particle is  $m$ , charge is  $q$  and the applied magnetic field has magnitude  $B$ . Consider only magnetic force on the particle.

- (A)  $\frac{qB}{4\pi m}$  (B)  $\frac{qB}{2\pi m}$  (C)  $\frac{qB}{\pi m}$  (D) none of these

- Q.10** A charge particle moving along +ve  $x$ -direction with a velocity  $v$  enters a region where there is a uniform magnetic field  $B_0(-\hat{k})$ , from  $x = 0$  to  $x = d$ . The particle gets deflected at an angle  $\theta$  from its initial path. The specific charge of the particle is :



- (A)  $\frac{v \cos \theta}{Bd}$  (B)  $\frac{v \tan \theta}{Bd}$  (C)  $\frac{v}{Bd}$  (D)  $\frac{v \sin \theta}{Bd}$

## ANSWER KEY

- |    |     |    |     |     |     |    |     |    |     |    |     |    |     |
|----|-----|----|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|
| 1. | 9   | 2. | 6   | 3.  | 3   | 4. | (D) | 5. | (B) | 6. | (D) | 7. | (A) |
| 8. | (A) | 9. | (B) | 10. | (D) |    |     |    |     |    |     |    |     |

