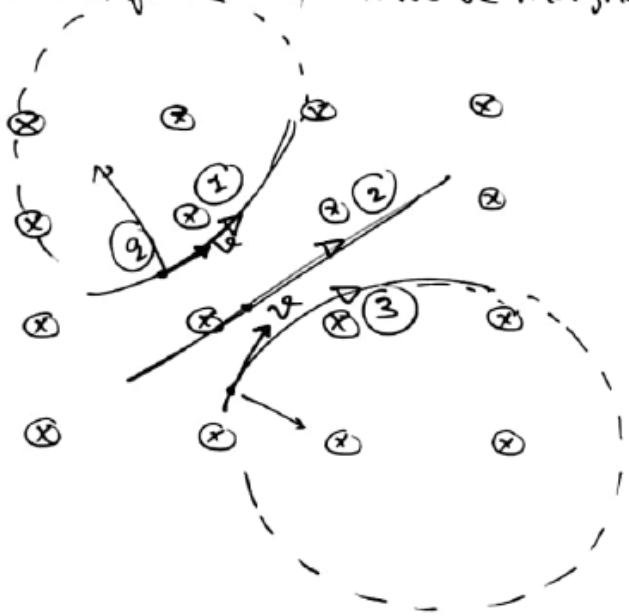
Q1) The charges 1, 2, 3 are moving in uniform transverse magnetic field then.

(a) 1 → +ve, Particle 3 → (−)

(b) 1 → (−ve), 3 → (+ve)

(c) 1 → (−ve) 2 − Neutral.

(d) 1 & 3 → +ve & 2 −, neutral.



Q2) Three charge proton, deutron & α-particle are projected in uniform transverse magnetic field then find ratio of their radii of Circular track respectively, If.

(a) $\underline{v}$ → same (b) P - same (c) K = same (d) Vacc → same.

(a) v → same $\quad R_p : R_d : R_\alpha = \frac{m_p v}{eB} : \frac{2m_p v}{eB} : \frac{2m_p v}{eB}$

$R_p = \frac{m_p v}{eB}$

$R_p : R_d : R_\alpha = 1 : 2 : 2$

$R_d = \frac{2m_p \cdot v}{eB}$

$R_p = R \quad R_d = 2R$

$R_\alpha = 2R$

$R_\alpha = \frac{2 m_p \times v}{2eB} = \frac{2m_p v}{eB}$

proton →	m_p	e
deutron →	$2m_p$	e
α-partice =	$4m_p$	2e

Q2) Three charge proton, deutron & α-particle are projected in uniform transverse magnetic field then find ratio of their radii of Circular track respectively, If.

(a) $\vec{v}$ → same (b) P - Same (c) EK = Same (d) Vace → Same.

(b) $R = \frac{mv}{qB}$ $\quad R = \frac{P}{qB}$

$R_p = \frac{P}{eB}$

$R_d = \frac{P}{eB}$

$R_\alpha = \frac{P}{2eB}$

$R_p : R_d : R_\alpha = \frac{P}{eB} : \frac{P}{eB} : \frac{P}{2eB}$

$R_p : R_d : R_\alpha = 1 : 1 : \frac{1}{2}$

$R_p : R_d : R_\alpha = 2 : 2 : 1$

$R_p = R,$

$R_d = R$

$R_\alpha = \frac{R}{2}$

proton →	m_p	e
deutron →	$2m_p$	e
α-partice =	$4m_p$	2e

Q2) Three charge proton, deutron & α-particle are projected in uniform transverse magnetic field then find ratio of their radii of Circular track respectively. If.

(a) $\vec{v}$ → same (b) P - same (c) E_K = same (d) Vacc → same.

$$R = \frac{mv}{qB} = \frac{p}{qB} = \frac{\sqrt{2mE_K}}{qB} \qquad E_K = K$$

$$R = \frac{\sqrt{2mE_K}}{qB}$$

$$R_p : R_d : R_\alpha = \frac{\sqrt{2mK}}{eB} : \frac{\sqrt{2\times 2mK}}{eB} = \frac{\sqrt{2mK}}{eB} : \frac{\sqrt{2mK}}{eB} : \frac{\sqrt{2mK}}{eB}$$

$$R_p : R_d : R_\alpha = 1 : \sqrt{2} : \sqrt{2}$$

proton → m_p e

deutron → $2m_p$ e

α-particle = $4m_p$ 2e

$$R_p = \frac{\sqrt{2m_pK}}{eB}$$

$$R_d = \frac{\sqrt{2\times 2m_pK}}{eB}$$

$$R_\alpha = \frac{\sqrt{2\times 4m_pK}}{2eB}$$

Q2) Three charge proton, deutron & α-particle are projected in uniform transverse magnetic field then find ratio of their radii of Circular track respectively. If.

(a) $\vec{v} \rightarrow$ same (b) P- same (c) EK = same (d) Vacc → same.

$$R = \frac{mv}{qB} = \frac{p}{qB} = \frac{\sqrt{2mK}}{qB} = \frac{\sqrt{2mqV}}{qB}$$

$$R = \frac{\sqrt{2mqV}}{qB}$$

	m	q
proton	m_p	e
deutron	$2m_p$	e
α-particle	$4m_p$	2e

$$R_p = \frac{\sqrt{2m_p eV}}{eB}$$

$$R_d = \frac{\sqrt{2 \times 2m_p \times eV}}{eB}$$

$$R_\alpha = \frac{\sqrt{2 \times 4m_p \times 2eV}}{2eB}$$

$R_p : R_d : R_\alpha = \frac{\sqrt{2m_p eV}}{eB} : \frac{\sqrt{4m_p eV}}{eB} : \frac{\sqrt{4m_p eV}}{2eB}$

$R_p : R_d : R_\alpha = \sqrt{2} : \sqrt{4} : \sqrt{4}$

$= \sqrt{2} : 2 : 2$

$R_p : R_d : R_\alpha = 1 : \sqrt{2} : \sqrt{2}$

Q) Under the influence of a uniform magnetic field a charged particle moving in a circular orbit radius R with constant speed v. The Time period of the motion.

(a) depends on R & not on v. $\Rightarrow T = \frac{2\pi m}{qB}$

(b) depends on v & not R.

(c) depends on both R & v.

(d) independent of both R & v.

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Two particle A & B of masses m_A & m_B respectively & having the same charge are moving in a plane. A uniform magnetic field exists ⊥ to this plane. The speed of the particles are v_A & v_B respectively & the trajectories are shown in the figure.

(a) $m_A v_A < m_B v_B$.

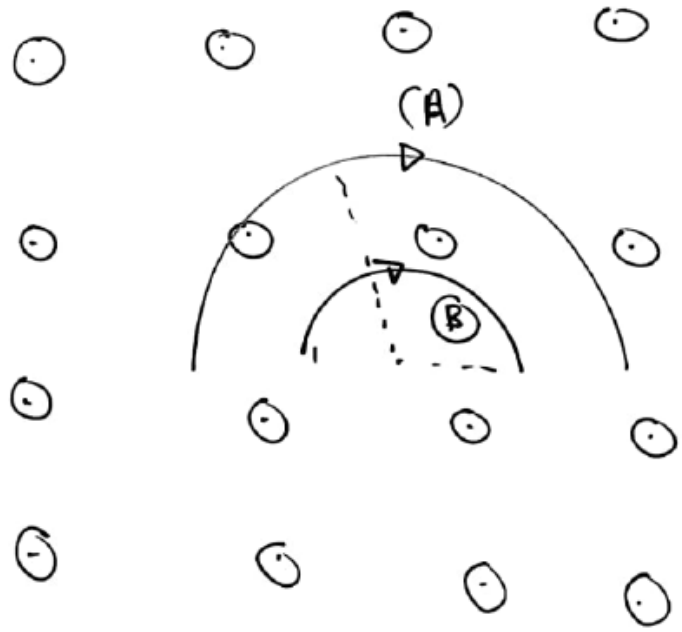
(b) $m_A v_A > m_B v_B$.

(c) $m_A < m_B$ & $v_A < v_B$

(d) $m_A = m_B$ & $v_A = v_B$

trajectories

A	B
m_A	m_B
v_A	v_B
q	q
B	B



$$R_A > R_B$$

$$\frac{m_A v_A}{qB} > \frac{m_B v_A}{qB}$$

$$m_A v_A > m_B v_B$$

Q4 Ionized hydrogen atom & α-particle with same momentum enters perpendicular to magnetic field. $r_H : r_\alpha$ will be.

(a) 1:2 (b) 2:1 (c) 1:4 (d) 4:1.

$H^+ \rightarrow$ proton $\rightarrow m_p$, e

$\alpha \rightarrow 4m_p$ $2e$

$$R_{H^+} = \frac{P}{eB}$$

$$R_\alpha = \frac{P}{2eB}$$

$$\frac{R_H}{R_\alpha} = \frac{P}{eB} \times \frac{2eB}{P} = 2:1$$

Q5 A particle of mass m, charge q & Kinetic Energy T enters in transverse magnetic field B. After 3 second the Kinetic Energy of the particle will be.

(a) T

(b) 2T.

(c) 3T.

(d) 4T.