QUES 01:-

Two ions having same mass have charges in the ratio 1 : 2. They are projected normally in a uniform magnetic field with their speeds in the ratio 2 : 3. The ratio of the radii of their circular trajectories is : [July 25, 2021 (II)]

(a) 1 : 4 (b) 4 : 3 (c) 3 : 1 (d) 2 : 3

(b) Given,

$$\frac{q_1}{q_2}=\frac{1}{2} \;\&\; \frac{v_1}{v_2}=\frac{2}{3}$$

Radius of circular path,

$$R=\frac{mv}{qB}$$ Where,

m = mass of charged particle

B = magnetic field

$$\therefore \frac{R_1}{R_2}=\frac{\frac{mv_1}{Q_1B}}{\frac{mv_2}{Q_2B}}=\frac{v_1}{v_2}\times\frac{q_2}{q_1}=\frac{2}{3}\times\frac{2}{1}=\frac{4}{3}$$