

1/07/21 Physics:-

(1) Radius of circular path by the proton in the mag field
 fixed can be described as

$$r = \frac{1}{B} \sqrt{\frac{2mV}{q}}$$

B = Magnetic field

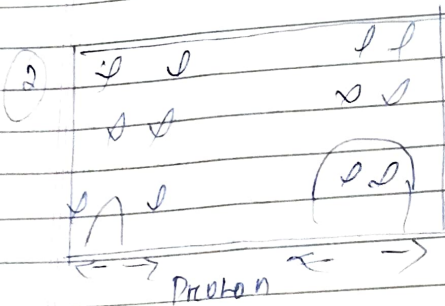
V = potential difference

let r be r_1 & r_2

potential difference is V and r be

radius when potential difference is $2V$

$$\frac{r_1}{r_2} = \sqrt{\frac{2V}{V}} = \sqrt{2}$$



Mass of deuteron = $2m$ (1 proton + 1 neutron)

Mass of proton = m (1 proton)

$$R(\text{proton}) = \frac{mv}{qB}$$

$$R(\text{deuteron}) = \frac{2m \times V}{qB}$$

$$\text{Ratio} \left(\frac{\text{Proton}}{\text{deuteron}} \right) = \frac{1}{2}$$

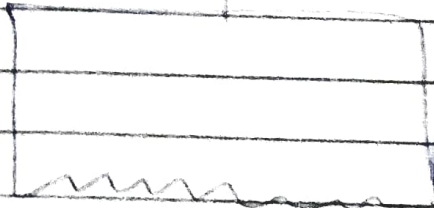
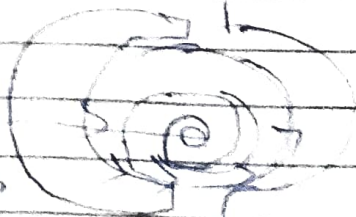
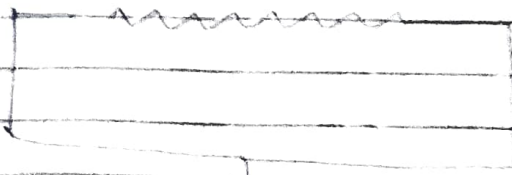
(B) Cyclotron

Device used to accelerate charged particles like protons, deuterons & particles etc. to very high energy.

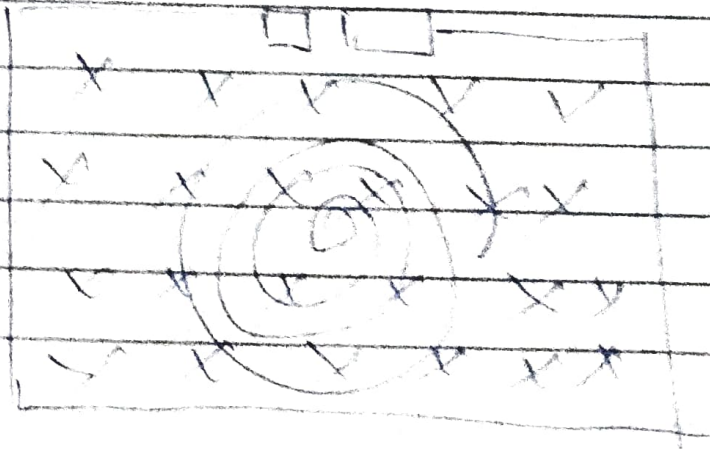
$$q v B \sin 90^\circ = \frac{mv^2}{r}$$

$$q = \frac{2\pi r}{\lambda} \quad \frac{2\pi r}{\lambda} = \frac{mv}{qB} = \frac{2\pi r}{qB} \cdot \frac{2\pi r}{\lambda}$$

High frequency oscillates



Target

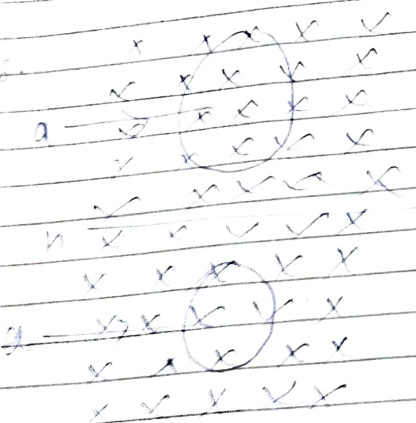


4. Particles will not accelerate with same velocity
 frequency of proton is lower than frequency
 of alpha particles.

$$v = \frac{Bqr}{m} \rightarrow v \propto \frac{q}{m}$$

$$v \propto \frac{2q}{4m}$$

$$v \propto \frac{q}{m}$$



Alpha electron will
 move in circle who
 direction and electron
 will make anticlock
 wise

direction according
 to the right hand rule.