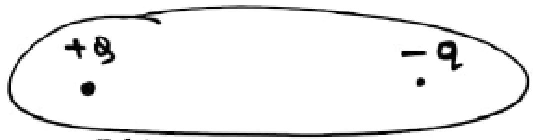
⇒ **Q1:** two positive point charges.

repel

⇒ 

Attraction

⇒ 

Attraction

Q) How to check true electrification.

Attraction → Electrostatic force / Gravitational force.

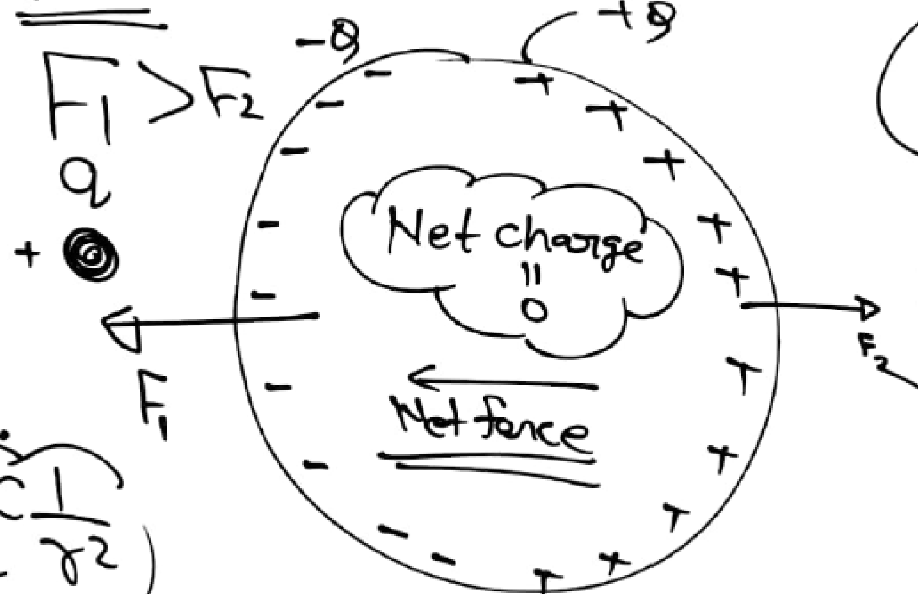
→ Repulsion force

Repulsion 100%

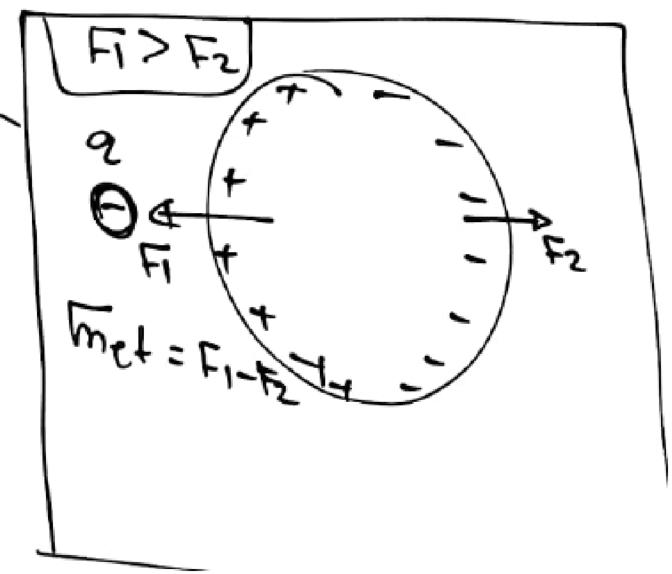
Q 1:- Can a point charge attract a neutral body.

Ans) Yes

$$Q = q\left[1 - \frac{1}{K}\right]$$



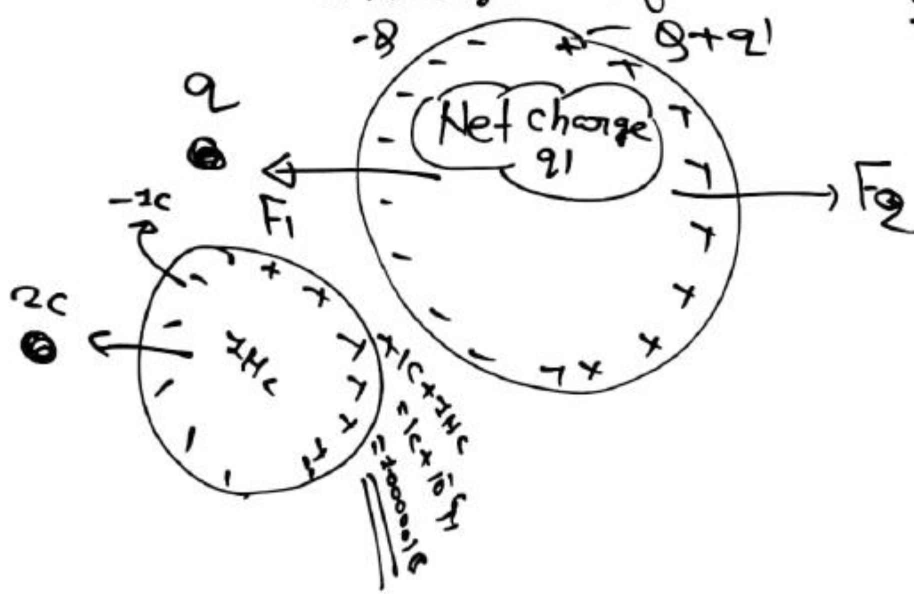
$$F \propto \frac{1}{r^2}$$



⟹ Can a point charge attract a neutral point mass.

Soll) NO

⟹ Q:- Can a ⊕ point charge attract a ⊕ charge body

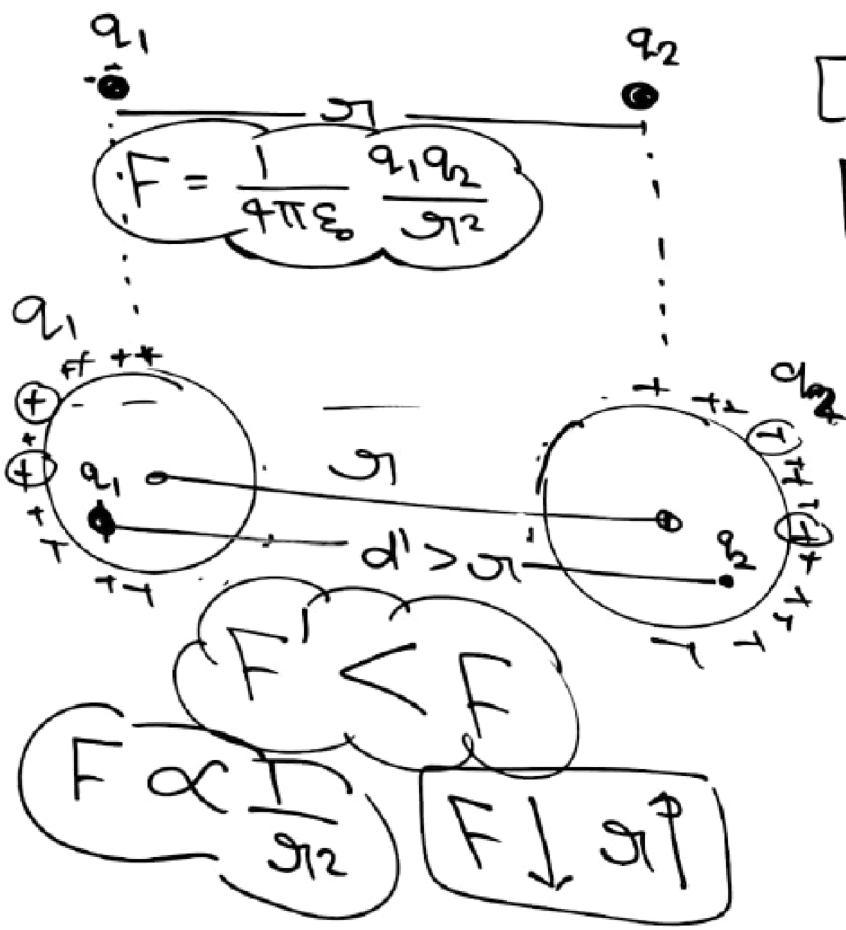


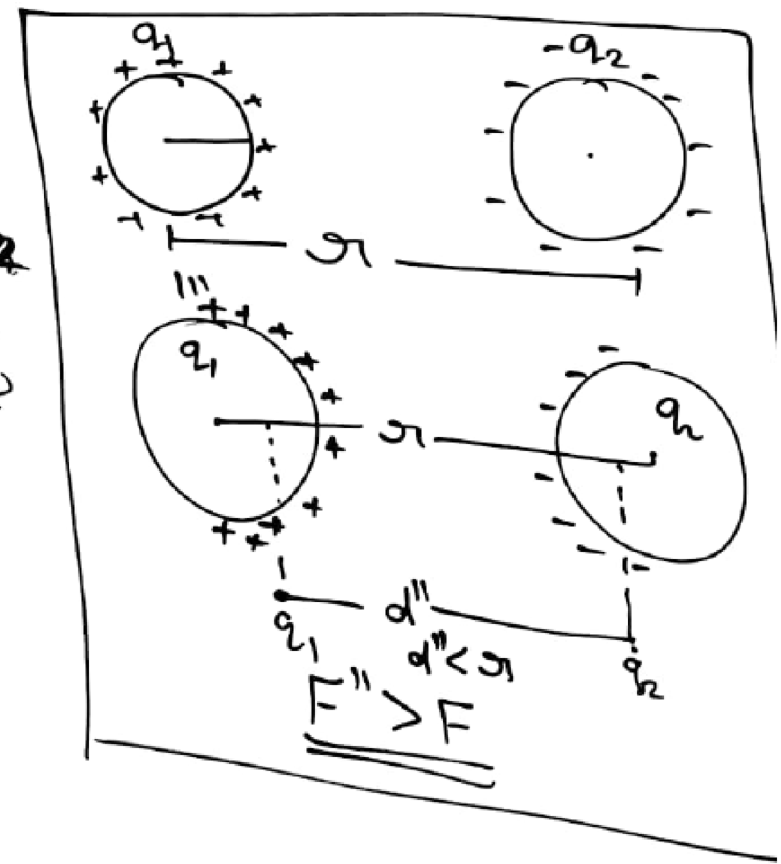
⟹ $F_1 > F_2$

Attraction

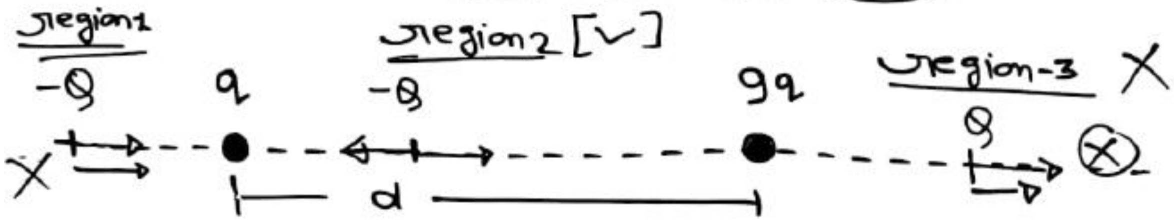
Ans) May be

[q_1 & q_2 both are +ive]



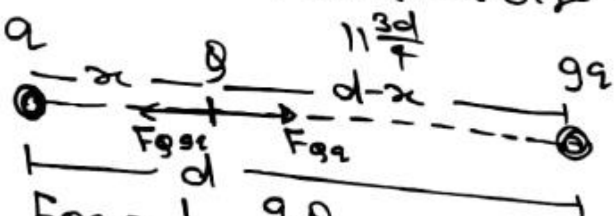


Equilibrium of point charge



If Net Force on Q is zero.

Find Location of third charge, where Net Force on third charge is zero.



$$F_{Qq} = \frac{1}{4\pi\varepsilon_0}\frac{qQ}{x^2}$$

$$F_{Q9q} = \frac{1}{4\pi\varepsilon_0}\frac{(9q)Q}{(d-x)^2}$$

$$F_{Qq} = F_{Q(9q)}$$

$$\frac{1}{4\pi\varepsilon_0}\frac{qQ}{x^2} = \frac{1}{4\pi\varepsilon_0}\frac{Q(9q)}{(d-x)^2}$$

$$(d-x)^2 = 9x^2$$

$$(d-x)^2 = (3x)^2$$

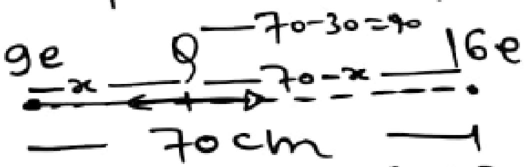
$$d-x = 3x$$

$$d = 4x$$

$$x = \frac{d}{4}$$

$\frac{d}{4}$ from q & $\frac{3d}{4}$ from 9q

Q1) Two charges are placed as shown in figure. Where should a third charge be placed so that it remains at rest.



(a) 30 cm from 9e

(b) 40 cm from 9e

(c) 40 cm from 16e

~~(d) 9 & c~~

$$F_{q(9e)} = \frac{1}{4\pi\varepsilon_0}\frac{(9e)q}{x^2} \quad [\rightarrow]$$

$$F_{q(16e)} = \frac{1}{4\pi\varepsilon_0}\frac{(16e)q}{(70-x)^2} \quad [\leftarrow]$$

$$F_{q(9e)} = F_{q(16e)}$$

$$\frac{1}{4\pi\varepsilon_0}\frac{(9e)q}{x^2} = \frac{1}{4\pi\varepsilon_0}\frac{(16e)q}{(70-x)^2}$$

$$\frac{9}{x^2} = \frac{16}{(70-x)^2}$$

$$\left(\frac{3}{x}\right)^2 = \left(\frac{4}{70-x}\right)^2$$

$$\frac{3}{x} = \frac{4}{70-x}$$

$$\Rightarrow 210 - 3x = 4x$$

$$210 = 7x$$

$$x = 30\text{ cm}$$

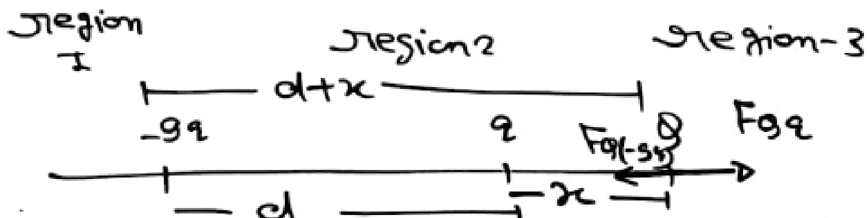
Equilibrium of charge:

↳ Equilibrium — Location of third charge does not depends. Nature of third charge & Magnitude of third charge.

$F \propto q_1 q_2$

$F \propto \frac{1}{r^2}$

Q1



$F_{Qq} = \frac{1}{4\pi\varepsilon_0}\frac{qQ}{x^2}$

$F_{Q(-9q)} = \frac{1}{4\pi\varepsilon_0}\frac{Q(9q)}{(d+x)^2}$

$F_{Qq} = F_{Q(-9q)}$

$\frac{1}{4\pi\varepsilon_0}\frac{qQ}{x^2} = \frac{1}{4\pi\varepsilon_0}\frac{Q(9q)}{(d+x)^2}$

$\frac{1}{x^2} = \frac{9}{(d+x)^2}$

$(d+x)^2 = 9x^2$

$(d+x)^2 = (3x)^2$

$d+x = 3x$

$d = 3x - x$

$d = 2x$

$x = \frac{d}{2}$