
समस्त बिहार, भरेगा हुंकार
HUNKAR
2025
में आपका स्वागत हैं

HUNKAR 2025

VIDYAKUL

PHYSICS

JP UJALA Sir

VIDYAKUL

अध्याय 02

Problems on Potential
विद्युत विभव पर समस्याएं

आज का टॉपिक

* $\Delta PE = W_{A \to B} = KQq_0 \left[\frac{1}{r_1} - \frac{1}{r_2}\right]$

* $PE = W_{\infty \to P} = \frac{KQq_0}{r}$

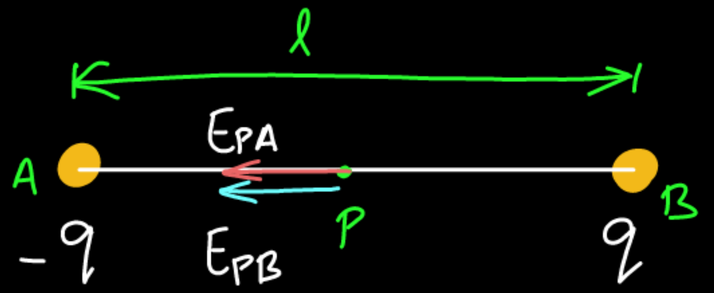
* $\Delta V = \frac{W_{A \to B}}{q_0} = \frac{KQq_0}{rq_0} \left[\frac{1}{r_1} - \frac{1}{r_2}\right] = KQ\left[\frac{1}{r_1} - \frac{1}{r_2}\right]$

* $V = \frac{W_{\infty \to P}}{q_0} = \frac{KQ}{r}$

* $V_{axial} = \frac{KP}{z^2}$ * $V_{arbitrary} = \frac{KP\cos\theta}{r^2}$

* $V_{eq} = 0$

①



$$E \neq 0$$
$$V = 0$$

a) Find the electric field intensity at Point P.

बिंदु P पर विद्युत क्षेत्र तीव्रता ज्ञात करें

$$E_{PA} = \frac{Kq}{(l/2)^2} = \frac{4Kq}{l^2}$$

$$E_{PB} = \frac{Kq}{(l/2)^2} = \frac{4Kq}{l^2}$$

$$E_{net} = \frac{8Kq}{l^2}$$

Ans.

(b) Find the Potential at P.

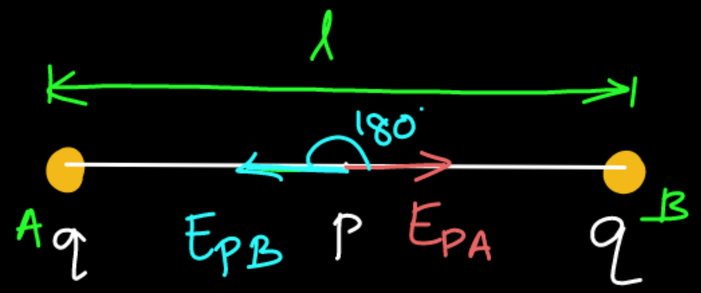
बिंदु P पर विद्युत विभव ज्ञात करें

$$V_{PA} = \frac{-Kq}{l/2}$$

$$V_{PB} = \frac{+Kq}{l/2}$$

$$V_P = 0$$

⊛(11)



$E = 0$

$V \neq 0$

a) Find the Electric field intensity at Point P.

बिंदु P पर विद्युत क्षेत्र तीव्रता ज्ञात करें

$$|\vec{E}_{PA}| = \frac{Kq}{(l/2)^2} = \frac{4Kq}{l^2}$$

$$|\vec{E}_{PB}| = \frac{Kq}{(l/2)^2} = \frac{4Kq}{l^2}$$

$$E_{net} = 0$$

(b) Find the Electric Potential at P.

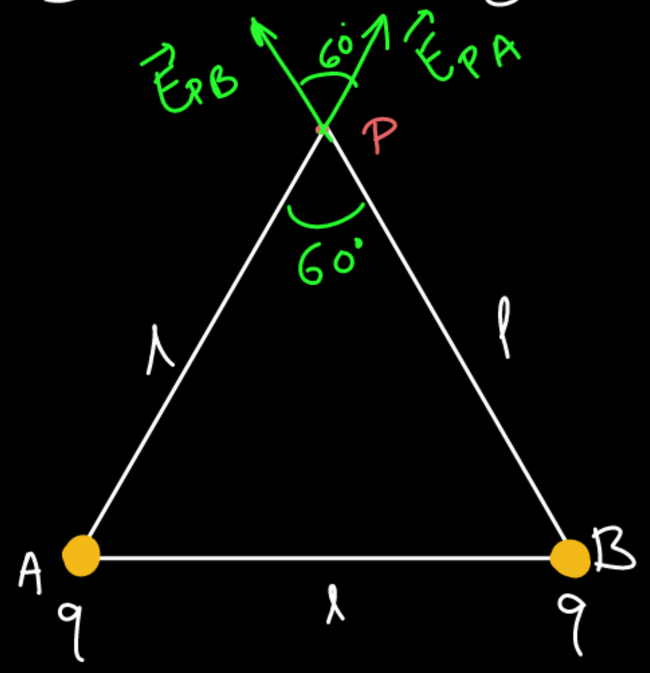
बिंदु P पर विद्युत विभव ज्ञात करें।

$$V_{PA} = \frac{Kq}{l/2} = \frac{2Kq}{l}$$

$$V_{PB} = \frac{Kq}{l/2} = 2Kq/l$$

$$V_P = \frac{4Kq}{l}$$

Q. Find the Electric field intensity and Potential at Point P.
बिंदु P पर विद्युत क्षेत्र तीव्रता तथा विद्युत विभव ज्ञात करें



$V_P \neq 0$

$E_P \neq 0$

a) Electric field intensity.

$|\vec{E}_{PA}| = \frac{Kq}{l^2}$ E $|\vec{E}_{PB}| = \frac{Kq}{l^2}$ E

$R = \sqrt{A^2+B^2+2AB\cos\theta}$

$= \sqrt{E^2+E^2+2EE\cos 60^\circ}$

$= \sqrt{E^2+E^2+2E^2 \cdot \frac{1}{2}}$

$= \sqrt{3E^2} = \sqrt{3}E$

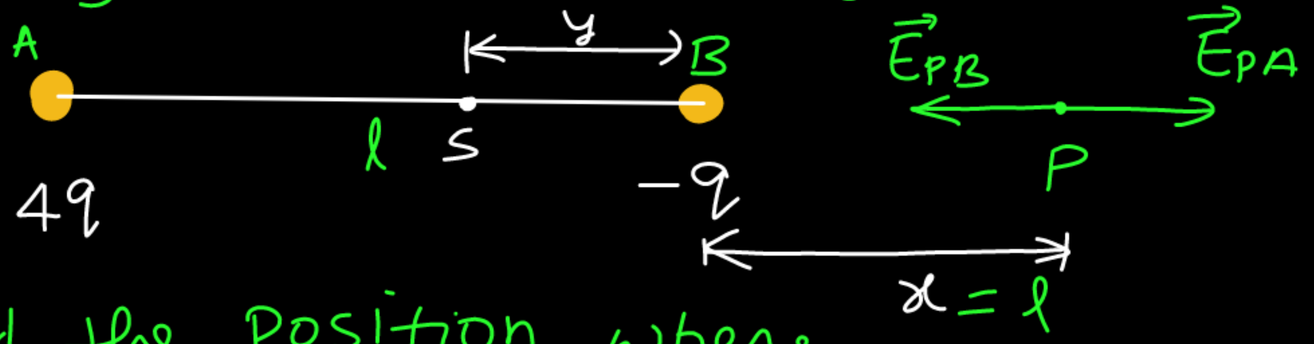
$E_{net} = \sqrt{3}\frac{Kq}{l^2}$

b) Electric Potential

$V_{PA} = \frac{Kq}{l}$ $V_{PB} = \frac{Kq}{l}$

$V_P = \frac{2Kq}{l}$

(A.) Find the position where electric field is zero.
ऐसा बिंदु ज्ञात करें जहाँ विद्युत क्षेत्र तीव्रता शून्य होगी.



$$E_{PB} = \frac{Kq}{x^2}$$

$$E_{PA} = \frac{K4q}{(l+x)^2}$$

For zero field.

$$\frac{Kq}{x^2} = \frac{4Kq}{(l+x)^2}$$

$$\left(\frac{l+x}{x}\right)^2 = 4$$

$$\frac{l+x}{x} = 2$$

$$l+x = 2x$$

$$\boxed{l = x}$$

(*) Find the position where Potential is zero.
वह बिंदु ज्ञात करें जहाँ विभव शून्य हो.

$$\frac{K4q}{l-y} - \frac{Kq}{y} = 0$$

$$\frac{4Kq}{l-y} = \frac{Kq}{y}$$

$$4 = \frac{l-y}{y}$$

$$4y = l-y$$

$$5y = l$$

$$\boxed{y = l/5}$$