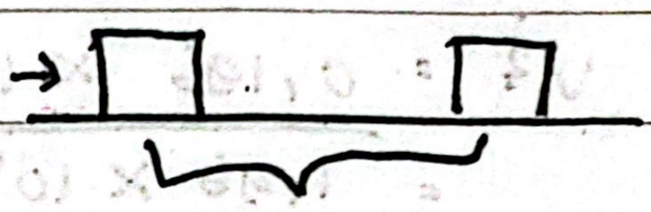
NO.

Date 22 . 04 . 2024

Kalisma

Usaha dan Energi dalam Kelistrikan

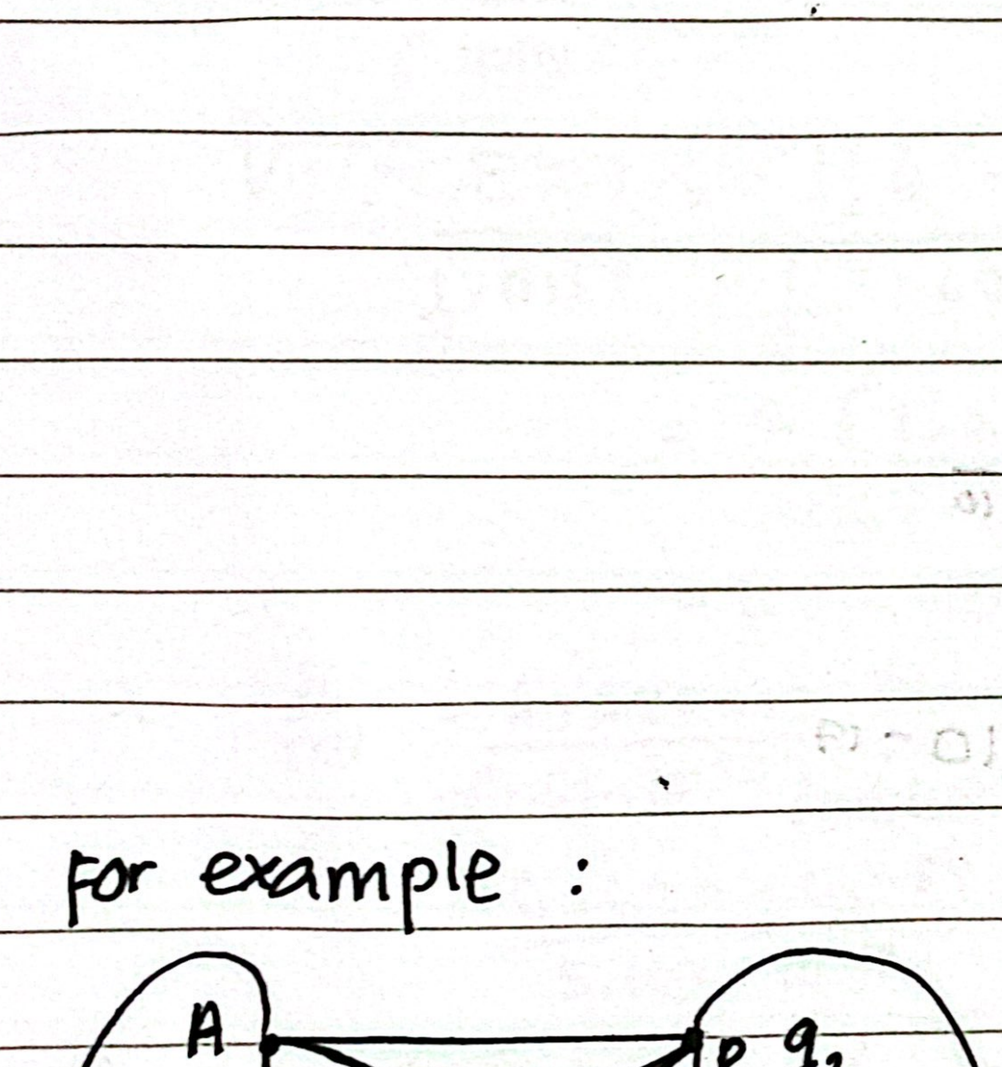
$W = \int F\, dr \rightarrow \vec{dr}$



$$W = \int F\, dr$$
$$= -q \int E\, dr$$
$$= -q \left[-k \frac{Q}{r} \right] = qV$$

$$\boxed{W = qV}$$

for example :



$$W_1 = q_1 V_1$$
$$= 0$$
$$W_2 = q_2 V_2$$
$$V_2 = k \frac{q_1}{a}$$

$$W_2 = k q_2 \frac{q_1}{a} = k \frac{q_1 q_2}{a}$$

$$W_3 = q_3 V_3$$
$$V_3 = k \frac{q_1}{\sqrt{2}a} + k \frac{q_2}{a}$$
$$W_3 = k \left[\frac{q_1 q_3}{\sqrt{a}+} + \frac{q_2 q_3}{a} \right]$$

$$W_4 = q_4 V_4 \rightarrow V_4 = k\left[\frac{q_1}{a} + \frac{q_2}{\sqrt{2}a} + \frac{q_3}{a}\right]$$

$$= k\left[\frac{q_1 q_4}{a} + \frac{q_2 q_4}{\sqrt{2}a} + \frac{q_3 q_4}{a}\right]$$

$$W_{tot} = W_1 + W_2 + W_3 + W_4$$

$$= \sum_{i=1}^{n} \sum_{j \neq i}^{m} q_i \frac{q_j}{4\pi\varepsilon_0}$$

$$= \frac{1}{8\pi\varepsilon_0} \sum_{i=1}^{n} q_i \sum_{j \neq i}^{n} \frac{q_j}{r_{ij}}$$

$$= \frac{1}{2} \sum_{i=1}^{n} q_i \sum \frac{1}{4\pi\varepsilon_0 r_{ij}} q_j$$

$$W = \frac{1}{2} \sum_{i=1}^{n} q_i \sum_{j \neq i}^{n} V_j$$

$W = \frac{1}{2} \int \lambda V \, dl$ potensial oleh muatan pada garis.

$W = \frac{1}{2} \int \sigma V \, ds$ Potensial oleh muatan pada permukaan

$W = \frac{1}{2} \int \rho V \, d\tau$ Volume

$$\rho = \varepsilon_0 \cdot \nabla \cdot \vec{E} \rightarrow \nabla \cdot \vec{E} = \frac{\rho}{\varepsilon_0}$$

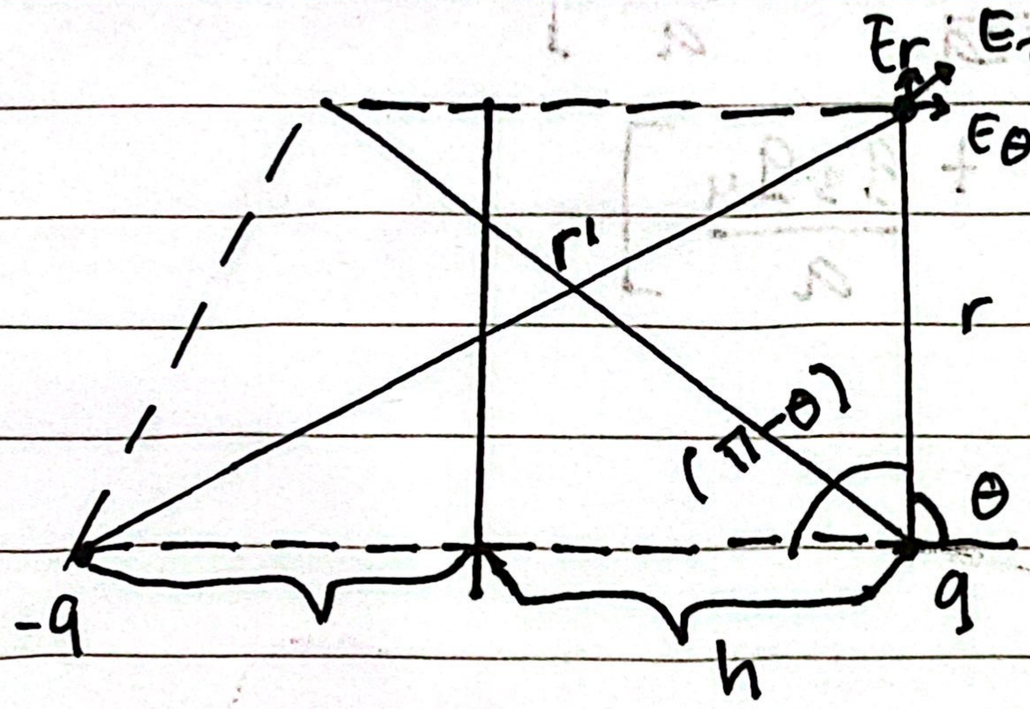
$$W = \frac{\varepsilon_0}{2} \int (\nabla \cdot E) V \, d\tau$$

$$W = \frac{\varepsilon_0}{2} \int E^2 \, d\tau$$

No.

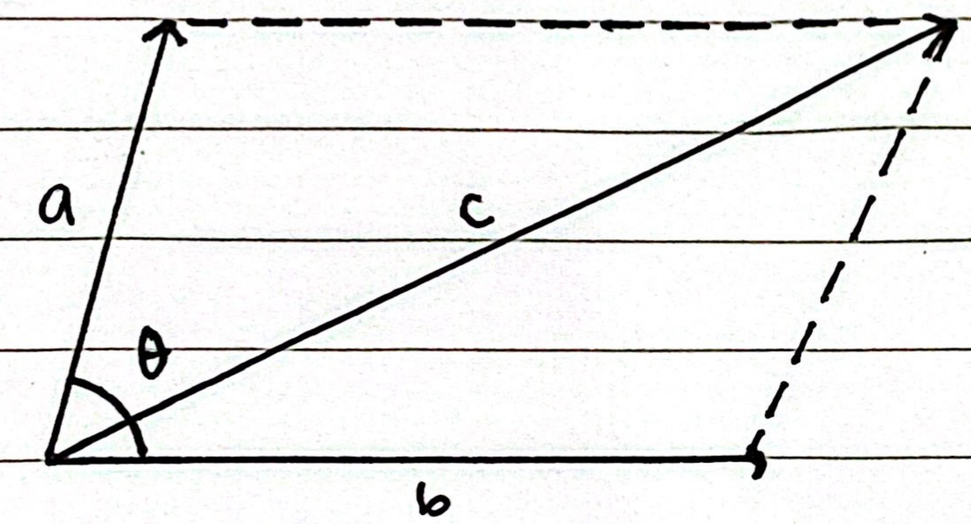
Date . .

Metode Bayangan



$$V_p = k\left[\frac{q}{r} + \frac{-q}{r'}\right]$$

$$= -kq\left[\frac{1}{r} - \frac{1}{\left(r^2+(2h)^2+4hr\cos\theta\right)^{1/2}}\right]$$



$$\vec{E}_r = -\frac{\partial V}{\partial r}$$

$\vec{E}_r$