

Usaha dan Energi



$$W = \int_a^b \vec{F} \cdot d\vec{l}$$

$$= -q \int \vec{E} \cdot d\vec{l}$$

Karena melawan
medan muatan sumber

$$= -q \left[\int \frac{1}{4\pi\epsilon_0} \frac{q}{p^2} dp \right] \quad (\text{untuk menetralkan})$$

$$= -q \left[-\frac{q}{4\pi\epsilon_0 p} \right]$$

$$= Q [V]$$

$$= QV$$

Contoh soal



$$W_1 = q_1 V_1 = 0$$

$$W_2 = q_2 V_2 = q_2 \left[K \frac{q_1}{r_1} \right]$$

$$W_3 = q_3 V_3 = q_3 \left[K \frac{q_1}{r_1} + K \frac{q_2}{r_2} \right]$$

$$W_4 = q_4 V_4 = q_4 \left[K \frac{q_1}{r_1} + K \frac{q_2}{r_2} + K \frac{q_3}{r_3} \right]$$

$$W = \frac{1}{2} \sum_{i=1}^n q_i V_i$$

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

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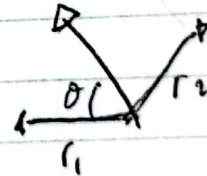
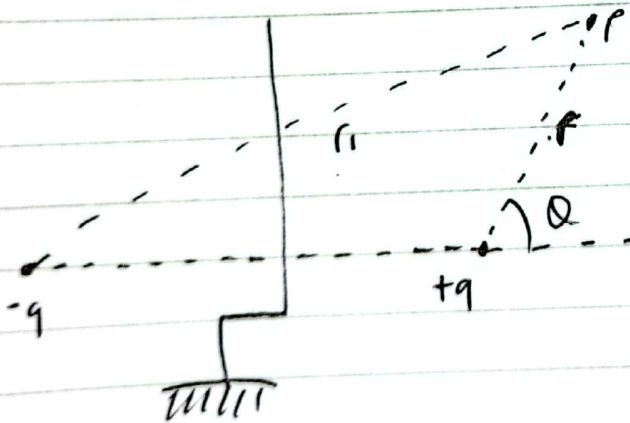
$$\rho = \epsilon_0 (\nabla \cdot \vec{E})$$

$$\nabla \cdot \vec{E} = \frac{\rho}{\epsilon_0}$$

$$W = \frac{\epsilon_0}{2} \int \vec{E} d\tau$$

BAB 3

Metode Bayangan



$$V = \frac{1}{4\pi\epsilon_0} \frac{q}{r} + \frac{-q}{4\pi\epsilon_0 r'}$$

$$= \frac{q}{4\pi\epsilon_0} \left[\frac{1}{r} - \frac{1}{r'} \right]$$

$$r' = (r^2 + q^2 + 2qr \cos \theta)^{\frac{1}{2}}$$

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$$p = (r^2 + 4h + 4hr \cos \theta)^{\frac{1}{2}}$$

$$E_r = \frac{dv}{dp} = K \left[\frac{1}{r} - \frac{1}{(r^2 + 4h^2 + 4hr \cos \theta)^{\frac{1}{2}}} \right]$$

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

Soln 2

