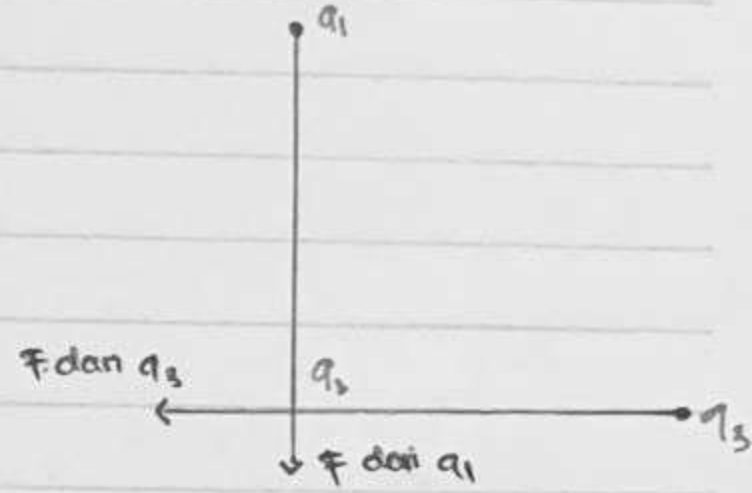
Tugas fisika

1.

$$F = k \cdot \frac{q_1 \cdot q_2}{r^2}$$

karena muatannya sama, saling tolak - menolak gayanya.

$$\Sigma F^2 = F_1^2 + F_2^2 + 2 \cdot F_1 \cdot F_2 \cdot \cos\theta$$
$$= F^2 + F^2 + 2F_1 \cdot 0$$
$$= 2F^2$$
$$\Sigma F = F\sqrt{2}$$



2. Dik: $q_1 = +4\ \mu C \rightarrow q_1 = 4 \times 10^{-6}$

$q_2 = -2\ \mu C \rightarrow q_2 = -2 \times 10^{-6}$

$r_1 = 10\ cm \rightarrow 10 \times 10^{-2}\ m$

$r_2 = 5\ cm \rightarrow 5 \times 10^{-2}\ m$

Dit: E .. ?

penyelesaian :

$$E = k \cdot \frac{q}{r^2}$$

$$E_1 = 9 \times 10^9 \left(\frac{4 \times 10^{-6}}{(10 \times 10^{-2})^2} \right) \qquad E_2 = 9 \times 10^9 \left(\frac{-2 \times 10^{-6}}{(5 \times 10^{-2})^2} \right)$$

$$E_1 = 9 \times 10^9 \left(\frac{4 \times 10^{-6}}{100 \times 10^{-4}} \right) \qquad E_2 = 9 \times 10^9 \left(\frac{-2 \times 10^{-6}}{25 \times 10^{-4}} \right)$$

$$E_1 = \frac{36}{100} \times 10^7 \qquad E_2 = \frac{18}{25} \times 10^7$$

$$E_1 = 0,36 \times 10^7 \qquad E_2 = 0,72 \times 10^7$$

$$E_A = 0,36 \times 10^7 + 0,72 \times 10^7$$
$$= 1,08 \times 10^7\ N/C$$

3. Dik: $q_A = 5 \times 10^{-8}$ C

$r_A = 10$ cm $\longrightarrow 10 \times 10^{-2}$ m

$q_B = -40 \times 10^{-8}$ C

$r_B = 20$ cm $\longrightarrow 20 \times 10^{-2}$ m

$q_C = 8 \times 10^{-8}$ C

$r_C = 10$ cm $\longrightarrow 10 \times 10^{-2}$ m

Dit : V diantic B ... ?

Penyelesaian :

$$V = k \cdot \frac{q_1}{r}$$

$$V_{tot} = V_A - V_B + V_C$$

$$= k \cdot \frac{q_A}{r_A} - k \cdot \frac{q_B}{r_B} + k \cdot \frac{q_C}{r_C}$$

$$= 9 \cdot 10^9 \left(\frac{5 \times 10^{-8}}{10 \times 10^{-2}} - \frac{40 \times 10^{-8}}{20 \times 10^{-2}} + \frac{8 \times 10^{-8}}{10 \times 10^{-2}} \right)$$

$$= 9 \times 10^9 \left(0{,}5 \times 10^{-6} - 2 \times 10^{-6} + 0{,}8 \times 10^{-6} \right)$$

$$= 9 \times 10^9 \left(-0{,}7 \times 10^{-6} \right)$$

$$= -6{,}3 \times 10^3 \text{ V}$$

$V_{total} = -6.300$ V

4. Ada dua rangkaian kapasitas total

$C_R = 7 + 5 = 12$ μF

$C_{P_2} = 4 + 2 = 6$ μF

Kapasitas kapacitor total sebagai rangkaian seri

$$\frac{1}{C_S} = \frac{1}{12} + \frac{1}{4} + \frac{1}{6} \longrightarrow \frac{1}{C_S} = \frac{1+3+2}{12} = \frac{6}{12}$$

$$C_S = \frac{12}{6} = 2 \text{ μF}$$

Besar energi pada kapacitor

$W = \frac{1}{2} \cdot C \cdot V^2$

$W_{tot} = \frac{1}{2} \cdot C_{tot} \cdot V^2_{tot}$

$= \frac{1}{2} (2 \times 10^{-6}) (24)^2$

$= 576 \times 10^{-6}$

$= 576$ μJ

$= 5{,}76 \times 10^{-4}$ J