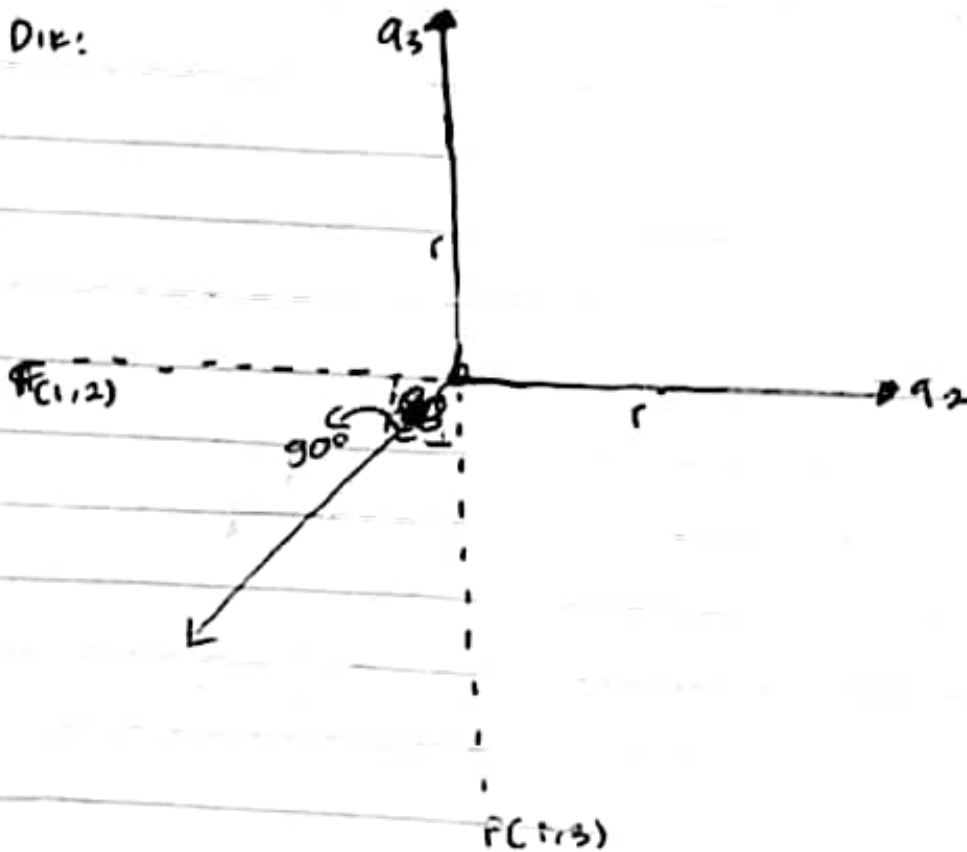


Nama: Adonia. Ahomen. Sobolim

1. Dik:



Dit: $\Sigma F = q_1, \dots$

Penye:

$$\begin{aligned}\Sigma F &= \sqrt{F(1,2)^2 + F(1,3)^2 + 2F(1,2) \cdot F(1,3) \cos 90^\circ} \\ &= \sqrt{F^2 + F^2 + 2 \cdot F \cdot F \cos 90^\circ} \\ &= \sqrt{F^2 + F^2 + 2 \cdot F^2 \cdot 0} \\ &= \sqrt{2F^2} = \sqrt{2} F \\ &= F\sqrt{2}\end{aligned}$$

2. Dik:

$$q_1 = +4 \text{ nC} = +4 \times 10^{-9} \text{ C}$$

$$q_2 = -2 \text{ nC} = -2 \times 10^{-9} \text{ C}$$

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

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

$$k = 9 \times 10^9 \text{ Nm}^2/\text{C}^2$$

Dit: $E_A = \dots ?$

Penye:

Dicari medan listrik E_1 dan E_2

$$E_1 = \frac{kq}{r^2}$$

$$E_1 = \frac{4 \times 10^{-6} \text{ C}}{(5 \times 10^{-1})^2} = 9 \times 10^9 \left(\frac{4 \times 10^{-6}}{(10 \times 10^{-4})^2} \right)$$

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

$$E_1 = 4,25 \times 10^{-4} = 9 \times 10^9 \cdot 25 \times 10^{-2} \cdot \frac{56}{100} \times 10^8 = 0,36 \times 10^9$$

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

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

$$E_2 = \frac{18}{25} \times 10^7$$

$$E_2 = 0,72 \times 10^9$$

Sehingga

$$E_A = E_1 + E_2$$

$$E_A = 0,36 \times 10^9 + 0,72 \times 10^9$$

$$E_A = 1,08 \times 10^9 \text{ N/C}$$

3. Dik

$$q_A = 5 \times 10^{-8} \text{ C}$$

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

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

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

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

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

$$k = 9 \times 10^9$$

Dit V di titik B = ?

Penye:

$$V = k \frac{q}{r}$$

Sehingga

$$V_{\text{total}} = V_A - V_B + V_C$$

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

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

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

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

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

$$V_{\text{total}} = -6300 \text{ V}$$

4. Dik 2 rangkaian kapasitor paralel

$$C_1 = 4 + 5 = 12 \text{ } \mu\text{F}$$

$$C_2 = 4 + 2 = 6 \text{ } \mu\text{F}$$

Kapasitas kapasitor total sebagai rangkaian seri

$$\frac{1}{C_s} = \frac{1}{12} + \frac{1}{4} + \frac{1}{6}$$

$$\frac{1}{C_s} = \frac{1 + 3 + 2}{12} = \frac{6}{12}$$

$$C_s = \frac{12}{6} = 2 \text{ MF}$$

Besarnya energi pada kapasitor

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

$$W_{\text{total}} = \frac{1}{2} C_{\text{total}} \cdot V_{\text{total}}^2$$

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

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

$$= 576 \text{ J}$$

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