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Prodi : Pendidikan Fisika (B)

Pemecahan Kasus

* Kasus Muatan listrik

1). $N = (5-0{,}8)\cdot\frac{(6{,}02\times10^{23})}{107{,}9} + 0{,}8\,\frac{(6{,}02\times10^{23})}{197}$

$= 2{,}34\times10^{22} + 2{,}44\times10^{21}$

$= 2{,}58\times10^{22}$

Karena atom Ag mempunyai 47 elektron dan Au mempunyai 79 elektron maka jumlah kedua atom adalah 126 elektron.

Jumlah medan total Q adalah :

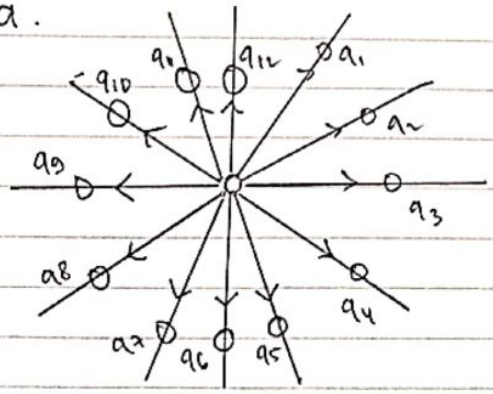
$Q = (2{,}58\times10^{22}\ \text{atom})\,(126\ \text{elektron})\,(1{,}6\times10^{-19}\ \text{C/elektron})$

$= 5{,}12\times10^{5}\ \text{C}$

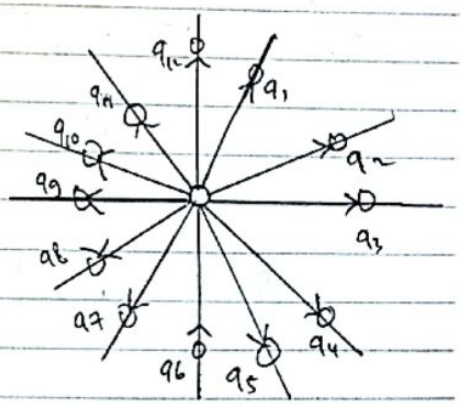
Jadi, Pada Cincin 5gr terdapat muatan $5{,}12\times10^{5}$C, dimana pada Cincin 5 gr terdapat $\frac{5{,}12\times10^{5}\text{C}}{1{,}6\times10^{-19}} = 3{,}25\times10^{24}$ elektron

* kasus gaya listrik

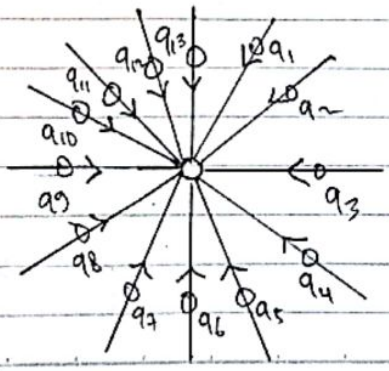
a.



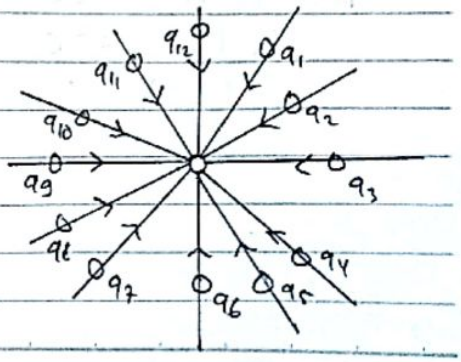
b.



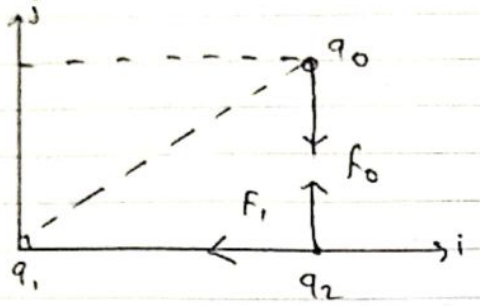
c.



d.



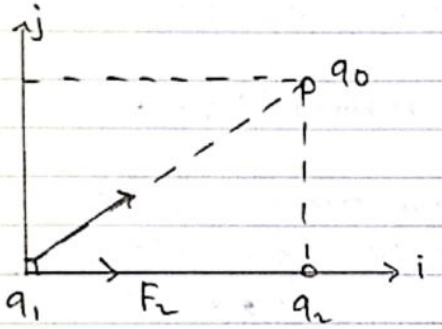
e. $q_1 = 25\ \mu C \rightarrow (0,0)\ m$
$q_2 = -10\ \mu C \rightarrow (4,0)\ m$
$q_0 = 10\ \mu C \rightarrow (4,3)\ m$



$$\bar{F} = q_0 k \left\{ \frac{q_1}{r_{q_1}^2} \hat{r}_{a_1} + \frac{q}{r_{a_2}^2} \hat{r}_{a_2} \right\}$$

$$= 10.9 \times 10^9 \left\{ \frac{25}{} + \frac{(-10)}{16} (i) \right\}$$

f. $q_1 = 25\ \mu C \rightarrow (0,0)$
$q_2 = -15\ \mu C \rightarrow (4,0)$
$q_0 = 20\ \mu C \rightarrow (4,3)$

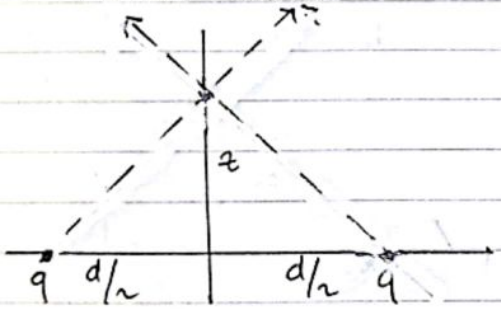


$$\bar{F} = q_0 k \left\{ \frac{q_1}{r_{q_1}^2} \hat{r}_{q_1} + \frac{q_2}{r_{q_2}^2} \hat{r}_{q_2} \right\}$$

$$= 20 \cdot 9 \times 10^9 \left\{ \frac{25}{} + \frac{(-15)}{16} (i) \right\}$$

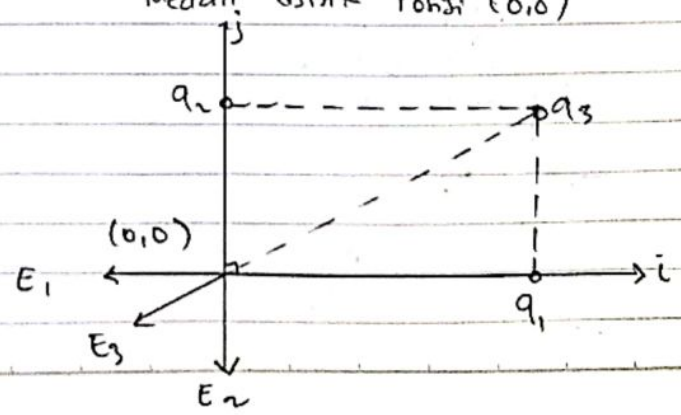
* kuat medan listrik

a.



b. $q_1(4,0) = 2C$
$q_2(0,3) = 5C$
$q_3(4,3) = 10C$

Medan listrik Posisi (0,0)



$\bar{E}_1 = \frac{1}{4\pi\varepsilon_0} \frac{2}{16} j$

Medan oleh q_1 $\bar{E}_2 = \frac{1}{4\pi\varepsilon_0} \frac{5}{9} (i)$

Medan oleh q_3 $E_3 = \frac{1}{4\pi\varepsilon_0} \frac{10}{25} \left(\frac{4i + 3j}{5}\right)$

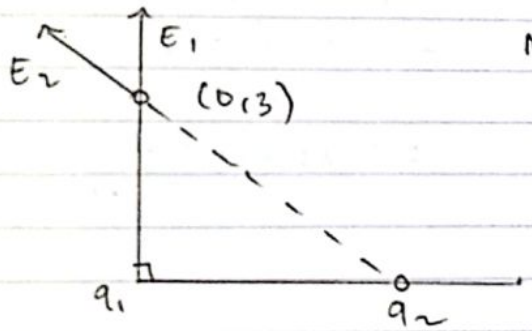
$= \frac{1}{4\pi\varepsilon_0} \left(\frac{40}{125} i + \frac{30}{125} j\right)$

Medan total : $\bar{E} = \frac{1}{4\pi\varepsilon_0} \left[\left(\frac{5}{9} + \frac{40}{125}\right) i + \left(\frac{2}{16} + \frac{30}{125}\right) j\right]$

$\bar{E} = \frac{1}{4\pi\varepsilon_0} \sqrt{(0,47)^2 + (0,8)^2} = 8,35 \times 10^2 \, N/C$

C. $q_1 = -5 \, nC \rightarrow (0,0)$

$q_2 = 10 \, nC \rightarrow (4,0)$



Medan oleh q_1 $\bar{E}_1 = \frac{1}{4\pi\varepsilon_0} \frac{5}{25} \left(\frac{4i + 3j}{5}\right)$

$= \frac{1}{4\pi\varepsilon_0} \left(\frac{20}{125} i + \frac{15}{125} j\right)$

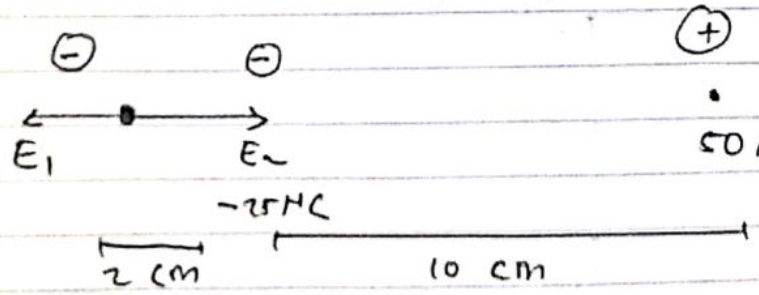
oleh q_2 $\bar{E}_2 = \frac{1}{4\pi\varepsilon_0} \frac{10}{16} (j)$

Total $\bar{E} = \frac{1}{4\pi\varepsilon_0} \left[\left(\frac{20}{125} (i) + \left(\frac{10+15}{16\ 125}\right) j\right]\right.$

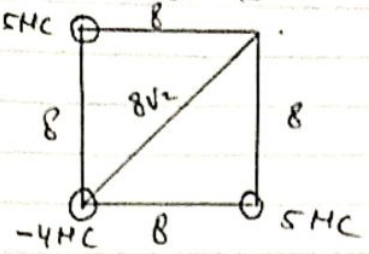
$= \frac{1}{4\pi\varepsilon_0} \sqrt{(0,16)^2 + (0,74)^2}$

$= \frac{1}{4\pi\varepsilon_0} \sqrt{0,5732}$

d. a).



* Potensial Listrik

1. 

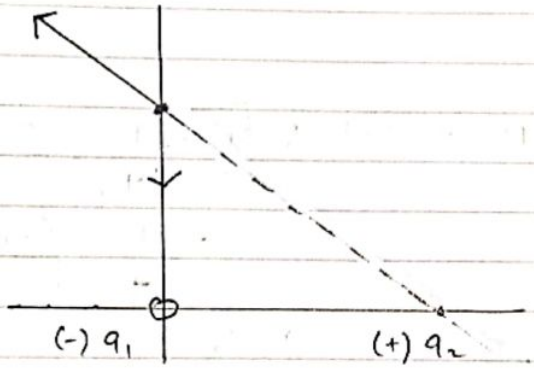
$V_{total} = \sum k \frac{q}{r}$

$= 9.10^9 . \frac{5.10^{-6}}{8} + \frac{5.10^{-6}}{8} . 9.10^9 - \frac{4.10^{-6} . 9.10^9}{8\sqrt{2}}$

$= 5,62.10^3 + 5,62.10^3 - 6,36.10^3$

$= 17,6 .10^3$

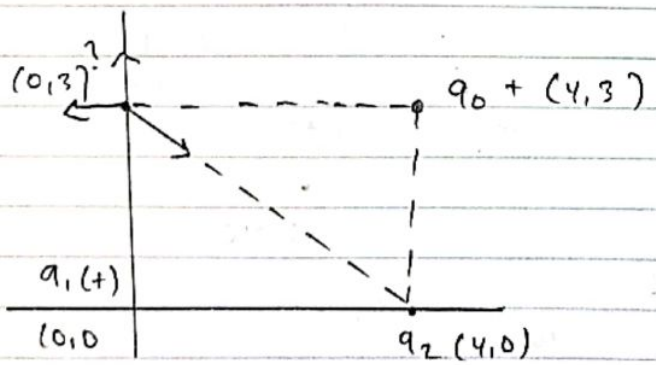
$= 1,76.10^4$ Volt

2. 

$V = \frac{kq_1}{r_1} + \frac{kq_2}{r_2}$

$= 9.10^6 \left(\frac{5}{3} + \frac{10}{4} \right)$

$= 3,75 \times 10^9 \frac{dyne\,cm}{HC}$

3. 

$q_1(0,0) = 25$ HC

$q_2(4,0) = -15$ HC

$q_0(4,3) = 20$ HC

Carilah titik (0,3)