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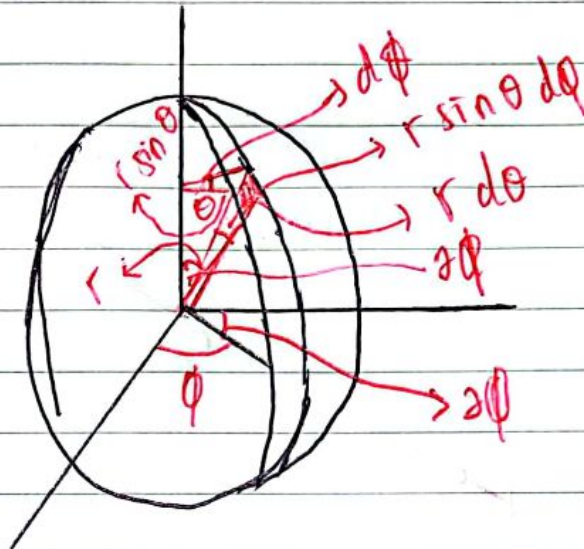
No. Senin

Date 09.03.2024

KALISMA

ru

Koordinat Bola



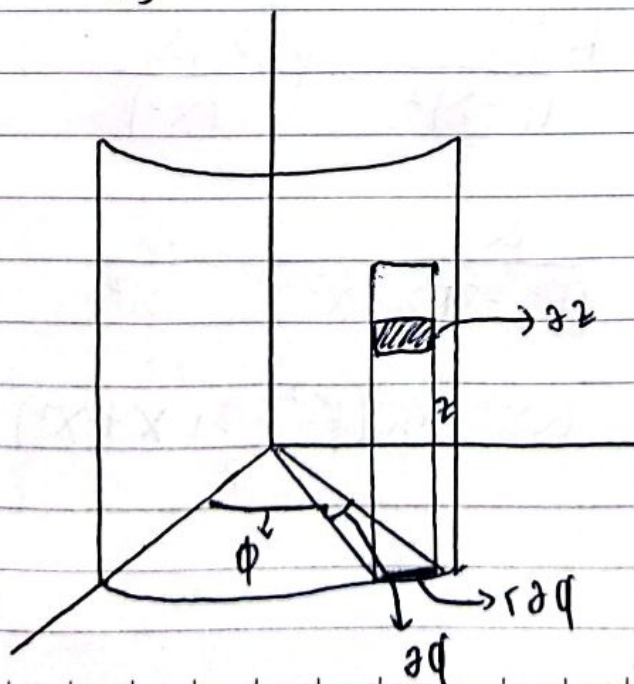
$$d\mathbf{a} = \partial \mathbf{r} \times \partial \mathbf{e}$$

$$= r \partial \theta \cdot r \sin \theta \partial \phi \approx r^2 \sin \theta + d\theta \partial \phi$$

$$\partial \phi = r^2 \sin \theta \partial \theta \partial \phi \partial r$$

$$dA = \int_0^\pi \int_0^{2\pi} r^2 \sin \theta \, d\theta \, d\phi$$

$$V = \iiint r^2 \sin \theta \, d\theta \, d\phi \, dr$$



Koordinat Silinder

$$A = r \, d\phi \, dz$$

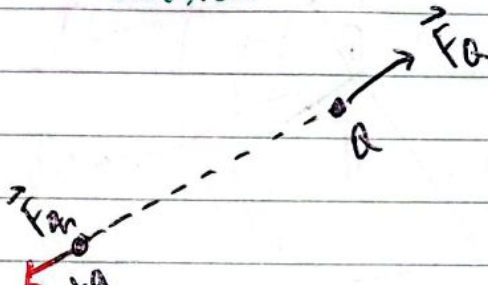
$$V = r \, d\phi \, dz \, dr$$

Gaya listrik

⇒ Muatan listrik

$$q = \pm Ne$$

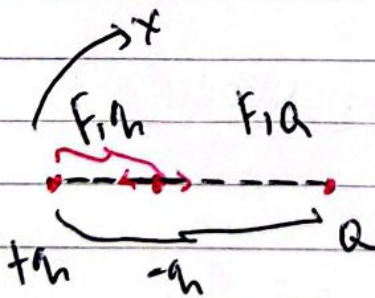
akan melepas elektron / yang kekurangan elektron



$$\vec{F}_{q1} = \vec{F}_{q2} = \vec{F} = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r^2} \hat{r}_0$$

gaya yang dikeluarkan sama,
besarannya yang berbeda.

Contoh :



$$-q_1 + q_2$$

$$Q \geq q_2$$

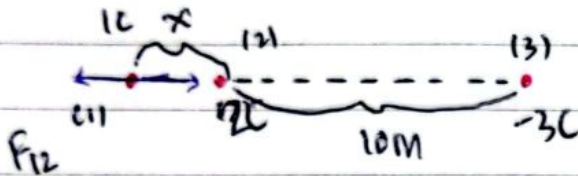
$$F_{1q1} = F_{1q2}$$

$$K \frac{q_1 q_2}{(r-x)^2} = K \frac{q_1 q_2}{x^2}$$

$$\frac{Q}{(r^2 - 2rx + x^2)} = \frac{q_2}{x^2}$$

$$Qx^2 = q_2 (r^2 - 2rx + x^2)$$

Kalisma

Soal

$$F_{12} = F_{13}$$

$$k \frac{1.2}{x^2} = k \frac{1.3}{(a+x)^2}$$

$$\frac{2}{x^2} = \frac{3}{x^2 + 20x + 100}$$

$$3x^2 = 2x^2 + 40x + 200$$

$$3x^2 = 2x^2 - 40x - 200 = 0$$

$$x^2 - 40x - 200 = 0$$

$$(x-20)(x-60)$$

Bila tidak bisa difaktorkan menggunakan $-b \pm \sqrt{b^2 - 4ac}$
2a

$$x^2 = -b \pm \sqrt{b^2 - 4ac}$$

$$= (-40) \pm \sqrt{\frac{(-40)^2 - 4 \cdot 1 \cdot (-200)}{2 \cdot 1}}$$

$$= -40 + \sqrt{\frac{1600 + 800}{2}}$$

$$= -40 + \sqrt{1200}$$

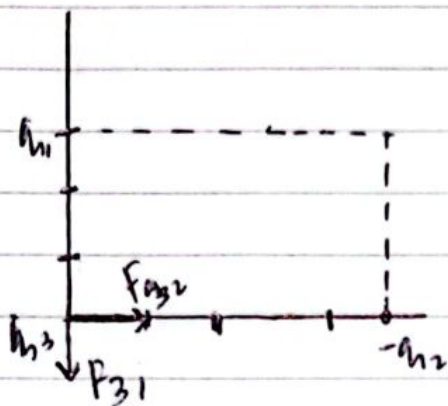
$$= -40 + 20$$

$$= -20$$

$$= -40 - 20$$

$$= -60$$

soal F_{h3}



$$\vec{F}_{32} = k \frac{q_3 \cdot q_2}{4^2} \frac{(3\hat{i} + 0\hat{j})}{\sqrt{3^2 + 0^2}}$$

$$= k \frac{q_3 q_2}{16} \hat{i}$$

$$\vec{F}_{31} = k \frac{q_3 q_1}{3^2} (-\hat{j}) = -k \frac{q_3 q_1}{9} \hat{j}$$

$$\vec{F} = \sqrt{k \frac{q_3 q_2}{16} + \left(-k \frac{q_3 q_1}{9} \right)}$$

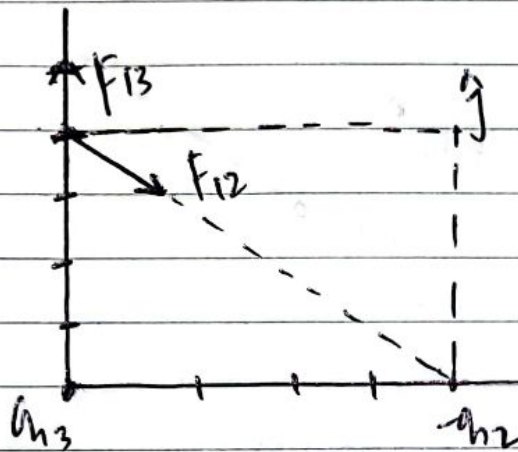
$$\vec{F} = k q_3 \left[\frac{q_2 \hat{i}}{16} - \frac{q_1 \hat{j}}{9} \right]$$

$$|\vec{F}| = k q_3 \sqrt{\left(\frac{q_2}{16} \right)^2 + \left(\frac{q_1}{9} \right)^2}$$

Notes $\hat{j} \hat{i}$ = kapasitas

Kalisan

Menghitung gaya yang dialami oleh q_1



$$a^2 + b^2 =$$

$$\vec{F}_{13} = k \frac{q_1 q_3}{3^2} \hat{j}$$

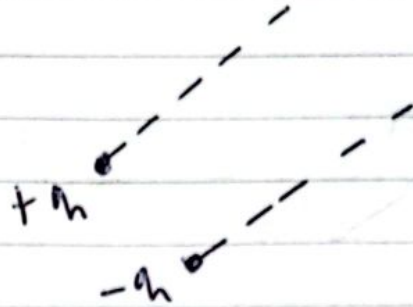
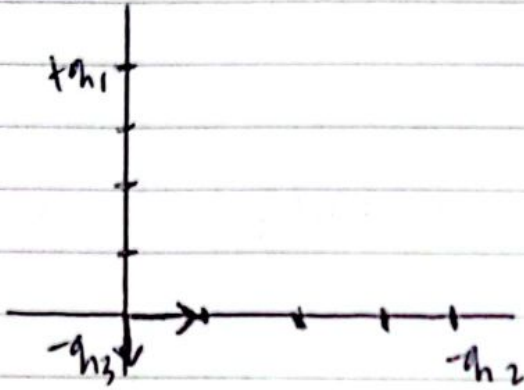
$$\vec{F}_{12} = k \frac{q_1 q_2}{5^2} (4\hat{i} - 3\hat{j})$$

$$= 4k \frac{q_1 q_2}{125} \hat{i} - 3k \frac{q_1 q_2}{125} \hat{j}$$

$$\vec{F} = k q_1 \left[\left(\frac{4q_2}{125} \right) \hat{i} + \left(\frac{q_3}{9} - \frac{3q_2}{125} \right) \hat{j} \right]$$

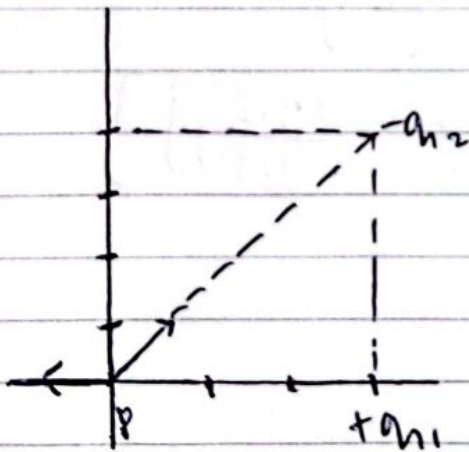
$\xrightarrow{5^2+5^1}$
 $\xrightarrow{3^2}$

Medan Magnet



$$F_{q3} = \frac{F_{32}}{q_3} = k \frac{q_3 q_2 / r^2}{q_3}$$

$$E = k \frac{q_2}{r^2} \hat{r}_0$$



$$\vec{E}_1 = k \frac{q_1}{3^2} (-\hat{i})$$

$$= k \frac{q_1}{9} \hat{i}$$

$$\vec{E}_2 = k \frac{q_2}{5^2} \left(\frac{3\hat{i} + 4\hat{j}}{5} \right)$$

$$= 3k \frac{q_2}{125} \hat{i} + 4k \frac{q_2}{125} \hat{j}$$

$$\vec{E} = k \left[\left(\frac{3q_2}{125} - \frac{q_1}{9} \right) \hat{i} + \frac{4q_2}{125} \hat{j} \right]$$