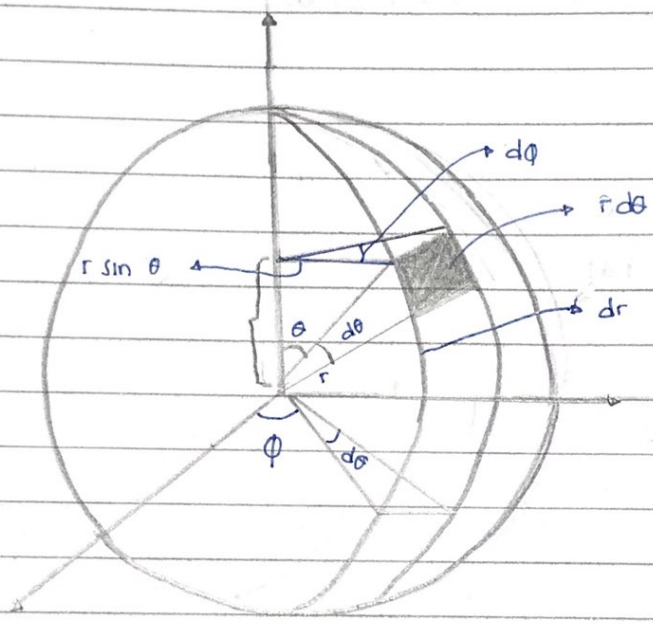
No. 01 - Maret - 2024

Date KELISTRIKAN.

Pertemuan 3.

"KELISTRIKAN DAN KEMAGNETAN"

* Koordinat polar



$$A = P \times l$$

$$= r\,d\theta \cdot r \sin\theta \cdot 2\phi$$

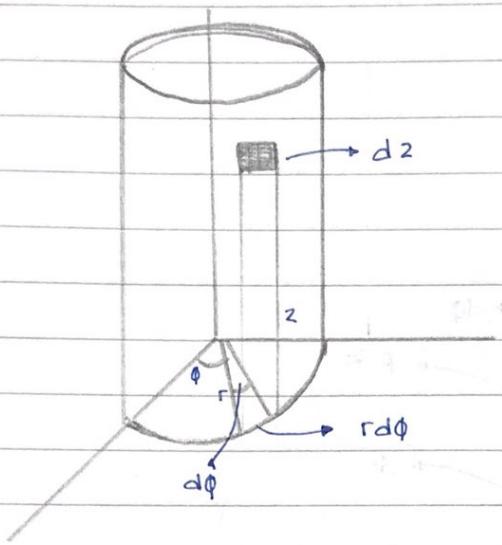
$$= r^2 \sin\theta \; 2\theta \; 2\phi$$

$$V = \frac{4}{3}\pi r^3$$

No.

Date . .

* Kordinat silinder

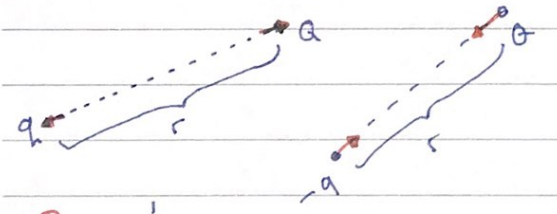


$A = r\,\partial\phi\,\partial z$

$V = r\,\partial\phi\,\partial z\,\partial r$

Listrik Statis

penerapan listrik statis ada pada petir.

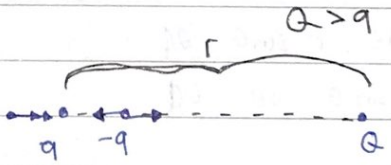


$$f = \frac{1}{4\pi\varepsilon_0}$$

ε_0 = Permitivitas Listrik

$$\varepsilon_0 = \frac{qQ}{r^2}\hat{r}_0$$

Misal :



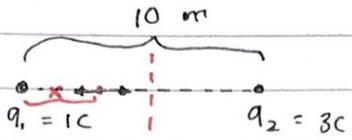
dimana letak
-q supaya
supaya seimbang

diletakan diseluruh situ supaya Q menarik -q sama besar dengan q menarik -q

No.

Date . .

Contoh soal



$q_3 = -2\ C$

$F_1 = F_2$

$$K\frac{q_1 q_3}{(r-x)^2} = K\frac{q_2 \cdot q_3}{x^2}$$

$$K\frac{1 \cdot 2}{(10-x)^2} = K\frac{2 \cdot 3}{x^2}$$

$$\frac{1}{x^2} = \frac{3}{(10-x)^2}$$

$$(10-x)^2 = 3x^2$$

$$100 + x^2 - 20x = 3x^2$$

$$x^2 - 3x^2 - 20x = -100$$

$$-2x^2 - 20x = -100$$

$$-2x^2 - 20x + 100 = 0$$

$$-x^2 - 10x + 50 = 0$$

Menggunakan rumus abc

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-10) \pm \sqrt{(-10)^2 - 4 \cdot (-1) \cdot (50)}}{2 \cdot (-1)}$$

$$= \frac{10 \pm \sqrt{100 + 200}}{(-2)}$$

No.

Date . .

$$= 10 \pm \frac{\sqrt{300}}{-2}$$

$$= 10 \pm \frac{\sqrt{300}}{-2}$$

$$= 10 \pm \frac{10\sqrt{3}}{2}$$

$$X_1 = \frac{10 + 17}{2}$$

$$= \frac{27}{2}$$

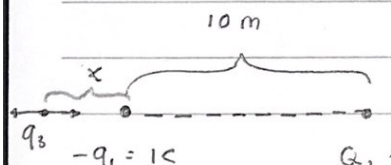
$$= 13,5$$

$$X_2 = \frac{10 - 17}{2}$$

$$= \frac{7}{2}$$

$$= 3,5$$

Soal ke 2.



q_3 terhadap q_1 tarik menarik

q_3 terhadap q_2 tolak menolak

$F_2 = F_1$ $\quad q_3 = 1C$

$$K\frac{q_1 q_3}{(r-x)^2} = K\frac{q_3 \cdot q_2}{x^2}$$

$$K\frac{1 \cdot 1}{(10+x)^2} = K\frac{1 \cdot 2}{x^2}$$

No.

Date . .

$$\frac{1}{x^2} = \frac{2}{(10+x^2)}$$

$$(10+x)^2 = 2x^2$$

$$100 + x^2 + 20x = 2x^2$$

$$2x^2 - x^2 - 20x - 100 = 0$$

$$x^2 - 20x + 100 = 0$$

$$x_{(1,2)} = \frac{-b \pm \sqrt{-b^2 - 4ac}}{2-1}$$

$$= \frac{-20 \pm \sqrt{(-20)^2 - (4 \cdot -1) \cdot 100}}{2}$$

$$= \frac{-20 \pm \sqrt{900 + 900}}{2}$$

$$= \frac{-20 \pm \sqrt{800}}{2}$$

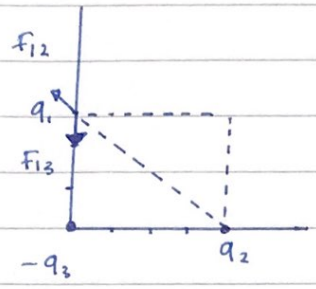
$$= \frac{-20 \pm 20\sqrt{2}}{2}$$

$$= \frac{-20 \pm 20\sqrt{2}}{2}$$

No.

Date . .

Contoh 3.



$$F_{13} = K \frac{q_3 \cdot q_1}{r^2}$$

$$= K \frac{q_1 \cdot q_3}{r^2} (-\hat{j}) \quad \rightarrow \hat{j} \text{ untuk sumbu y (-) karena ke bawah}$$

$$F_{13} = \frac{K \cdot (0\hat{i} - 3\hat{j})}{\sqrt{0^2 + 3^2}}$$

$$F_{12} = \frac{K \cdot -3\hat{j}}{3}$$

$$F_{13} = \frac{-3\hat{j}}{3}$$

$$F_{13} = -\hat{j}$$

$$F_{12} = K \cdot \frac{q_1 \cdot q_2}{r^2}$$

$$K \cdot \frac{q_1 \cdot q_2}{5^2} \left(\frac{-4\hat{i} + 3\hat{j}}{5} \right)$$

Sumbu x

sumbu y