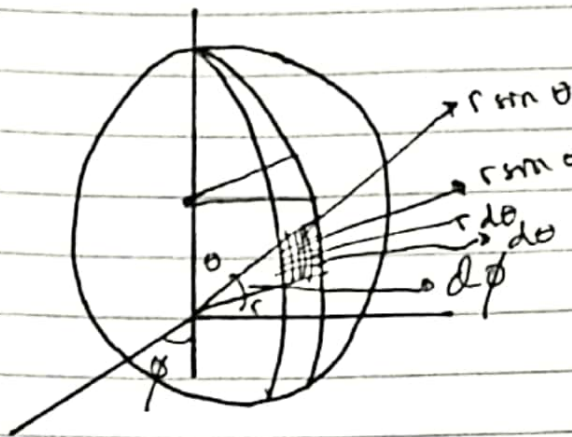
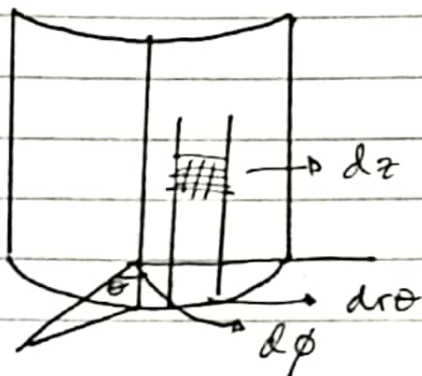


Sk. Lingkaran



$$\begin{aligned} da &= dr \times dl \\ &= r d\theta \cdot r \sin \theta \cdot d\phi \\ &= r^2 \sin \theta d\phi \\ dV &= r^2 \sin \theta d\theta d\phi \\ A &= \int_0^\pi \int_0^{2\pi} r^2 \sin \theta d\theta d\phi \\ V &= \iiint r^2 \sin \theta d\theta d\phi dr \end{aligned}$$

Sk. Tabung

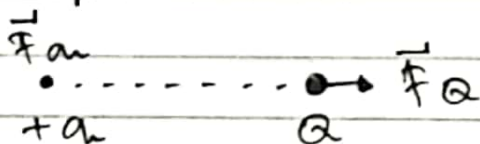


$$\begin{aligned} A &= r d\phi dz \\ V &= r d\phi dz dr \end{aligned}$$

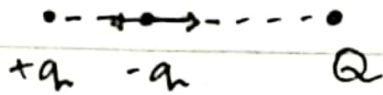
Gaya Listrik

Muatan Listrik

$$q = \pm Ne$$



$$\begin{aligned} \vec{F}_q &= \vec{F}_Q = \vec{F} = \frac{1}{4\pi} \frac{qQ}{r^2} \hat{r}_0 \\ &= \hat{r}_0 = \frac{r_0}{|r|} \end{aligned}$$

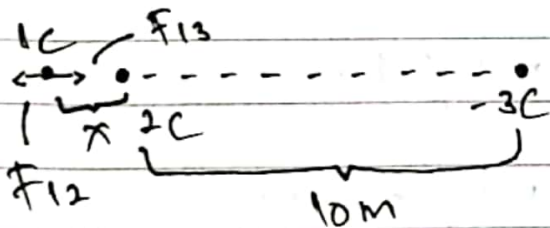


$$F_{12} = F_{13}$$

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

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

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



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

$$k \frac{1 \cdot 2}{x^2} = k \frac{1 \cdot 3}{(r+x)^2}$$

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

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

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

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

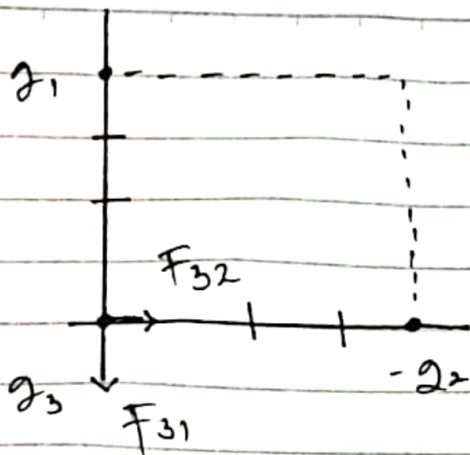
$$= \frac{-(-40) \pm \sqrt{(-40)^2 - 4 \cdot 1 \cdot -100}}{2 \cdot 1}$$

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

$$= \frac{-40 + \sqrt{400}}{2}$$

$$= \frac{-40 + 20}{2} = \frac{-20}{2} = -10$$

$$= -20 \quad = -60$$



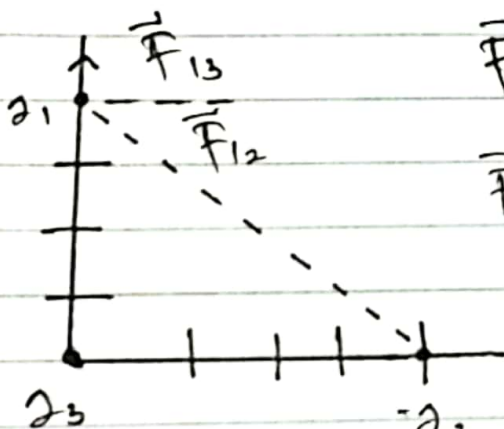
$$\vec{F}_{32} = k \frac{q_3 \cdot q_2}{4^2} \frac{(3\hat{i} + 0\hat{j})}{\sqrt{3^2 + 0^2}}$$

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

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

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

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

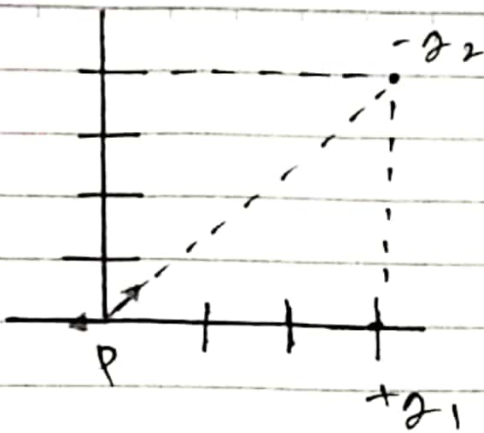


$$\vec{F}_{13} = k \frac{q_1 q_3}{3^2} \hat{j}$$

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

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

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



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

$$= k \frac{q_1}{9} (-\hat{i})$$

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

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

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