

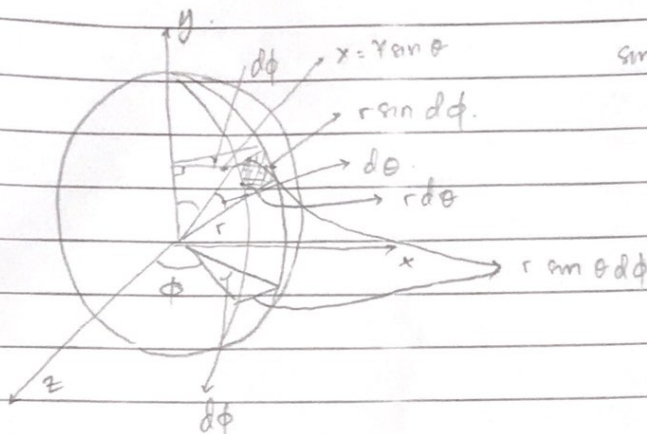
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No.:

Sistem Koordinat.

1) Koordinat Bola.



$$\sin \theta = \frac{x}{r}$$

$$x = r \sin \theta$$

$$da = dp \times dl$$

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

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

$$dV = dp \cdot d\theta \cdot dr$$

$$= r^2 \sin \theta d\theta d\phi dr$$

$$\nabla T = \hat{i} \frac{\partial T}{\partial x} + \hat{j} \frac{\partial T}{\partial y} + \hat{k} \frac{\partial T}{\partial z}$$

$$= \frac{\partial T}{\partial r} \hat{r} + \frac{1}{r} \frac{\partial T}{\partial \theta} \hat{\theta} + \frac{1}{r \sin \theta} \frac{\partial T}{\partial \phi} \hat{\phi}$$

$$\nabla \cdot T =$$

$$\nabla \times T =$$

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

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

$$= 2\pi r^2 \int_0^\pi \sin \theta d\theta$$

$$= 2\pi r^2 \left[-\cos \theta \right]_0^\pi$$

$$= 4\pi r^2$$

$$V = \int_0^\pi \int_0^{2\pi} \int_0^r r^2 \sin \theta d\theta d\phi dr$$

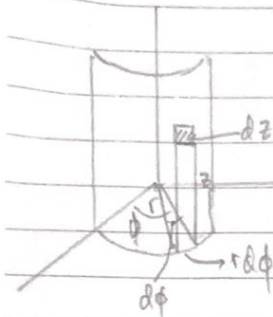
$$= \int_0^\pi \sin \theta d\theta \int_0^{2\pi} d\phi \int_0^r r^2 dr$$

$$= 2 \cdot (2\pi) \int_0^r r^2 dr$$

$$= 4\pi \left(\frac{1}{3} r^3 \right)$$

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

2) Koordinat Silinder.



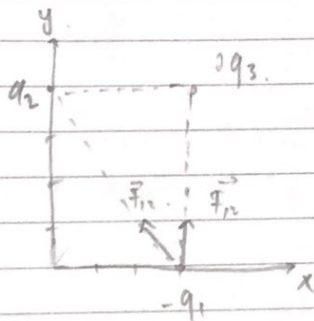
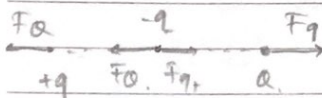
$$dA = dr \times dz$$

$$= r d\phi dz$$

$$dV = r d\phi dr dz$$

Gaya diupayakan/ditimbukan dari 2 muatan.

$$Q = \pm Ne$$



$$\vec{F}_{q_1} = \vec{F}_{12} = k \frac{q_1 q_2}{r^2} \hat{r}$$

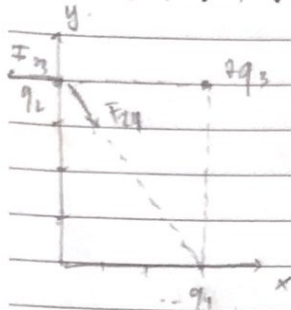
$$\vec{F}_{12} = k \frac{q_1 q_2}{5^2} (-3\hat{i} + 4\hat{j})$$

$$\hat{r} = \frac{\vec{r}}{|\vec{r}|}$$

$$= k q_1 \left(\frac{-3q_2}{125} \hat{i} + \frac{4q_2}{125} \hat{j} + \frac{2q_3}{16} \hat{j} \right)$$

$$= k q_1 \left[\frac{-3q_2}{125} \hat{i} + \left(\frac{4q_2}{125} + \frac{2q_3}{16} \right) \hat{j} \right]$$

$$= k q_1 \sqrt{0^2 + 0^2}$$



$$\vec{F}_{21} = k \frac{q_1 q_2}{5^2} (3\hat{i} - 4\hat{j})$$

$$\vec{F}_{23} = k \frac{q_2 (2q_3)\hat{i}}{3^2}$$

$$\vec{F}_{21} = \frac{3kq_1 q_2}{125} \hat{i} - \frac{4kq_1 q_2}{125} \hat{j}$$

$$= \frac{2kq_2 q_3}{9} \hat{i}$$

$$\vec{F}_{\text{total}} = \frac{3kq_1 q_2}{125} \hat{i} - \frac{2kq_2 q_3}{9} \hat{i} - \frac{4kq_1 q_2}{125} \hat{j}$$

$$\tan \theta = \frac{j}{i}$$

$$= kq_2 \left(\frac{3q_1}{125} \hat{i} - \frac{2q_3}{9} \hat{i} - \frac{4q_1}{125} \hat{j} \right)$$