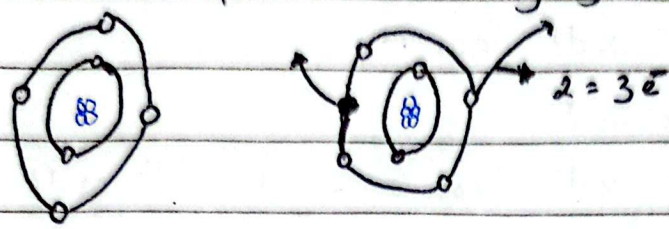
No.

Date : Jum'at
12 September 2025

Medan Elektromagnetik

Medan pada muatan yang terdistribusi

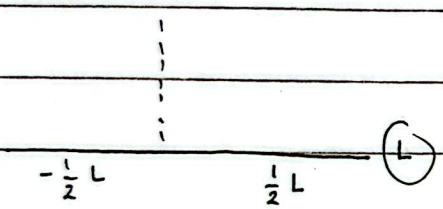


muatan : kata sifat dari elektron

$E \rightarrow T$

① $E = \frac{1}{4\pi\varepsilon_0 r^2}\hat{r}_0$ → diskrit

Contoh:



$= dE_y + dE_x$

$= dE_y$

$dE = dE \cos\theta$

$$E = \frac{1}{4\pi\varepsilon_0}\int \frac{dq}{r^2}\cos\theta$$

$$= \frac{1}{4\pi\varepsilon_0}\int_{-\frac{1}{2}}^{\frac{1}{2}} \frac{x\,da}{r^2}\cos\theta$$

$$= \frac{1}{4\pi\varepsilon_0}\int_0^2 \frac{x\,da}{r^2} - \frac{1}{4\pi\varepsilon_0}\int_0^2 \frac{x\,da\sin\theta}{r^2}$$

$d\vec{E} = dE_y + dE_x^{\,0}$

$= dE_y$

$d\vec{E} = dE\cos\theta$

Date :

$$\vec{E} = \frac{1}{4\pi\varepsilon_0}\int_{-L}^{L}\frac{dq}{r^2}\cos\theta$$

$$= \frac{1}{4\pi\varepsilon_0}\int_{-L}^{L}\frac{x\,dl}{r^2}\cos\theta$$

$$= \frac{1}{4\pi\varepsilon_0}\int_{0}^{2L}\frac{x\,dl}{r^2}\cos\theta - \frac{1}{4\pi\varepsilon_0}\int_{0}^{u}\frac{y\,dl}{r^2}\cos\theta$$

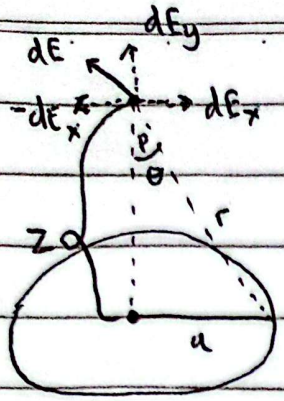
$$= \frac{1}{4\pi\varepsilon_0}\int_{0}^{u}\frac{y\,z}{r^2}\,dl$$

$$= \frac{1}{4\pi\varepsilon_0}\int_{0}^{u}\frac{y\,z\,dl}{(z^2+l^2)^{3/2}}$$

$$= \frac{z\lambda}{4\pi\varepsilon_0}\left[\frac{y}{2(z^2\,y)^2}\right]$$

No.

Date :



saling meniadakan

$$\vec{dE} = dE_x + dE_y$$
$$= dE_y$$
$$= \vec{dE}\cos\theta$$

$$\vec{E} = dE\cos\theta$$
$$= \frac{1}{4\pi\varepsilon_0}\int_0^{2\pi a}\frac{\lambda\, dl\cos\theta}{r^2}$$
$$= \frac{1}{4\pi\varepsilon_0}\int_0^{2\pi a}\frac{\lambda z}{r^3}\,dl$$
$$= \frac{1}{4\pi\varepsilon_0}\int_0^{2\pi a}\frac{\lambda z}{(z^2+a^2)^{3/2}}$$
$$= \frac{\lambda z}{4\pi\varepsilon_0(z^2+a^2)^{3/2}}\, l\Big|_0^{2\pi a}$$
$$= \frac{\lambda z}{4\pi\varepsilon_0}\cdot\frac{2\pi a}{(z^2+a^2)^{3/2}}$$
$$= \frac{\lambda z a}{2\varepsilon_0(z^2+a^2)^{3/2}}$$