No. 18-03-2024

Date Senin

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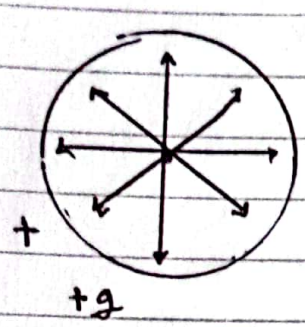
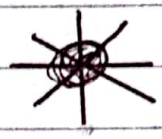
2213022077 (C)

# Medan listrik ($\vec{E}$)

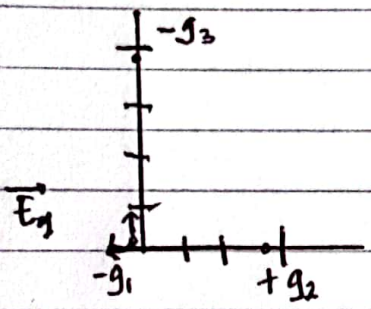



$\vec{E}_1 = \frac{\Sigma \vec{F}}{q_1}$

$= \frac{F_{q3}}{q_1} + \frac{F_{q2}}{q_1}$

$\vec{E} = k\frac{q_3}{p^2} + k\frac{q_2}{p^2}$




1). $\vec{E} = \frac{1}{4\pi\varepsilon}\frac{q}{y_0^2}\vec{P_0}$

$= k\frac{q}{p^2}\vec{P_0}$ → oleh muatan deskrit

2). $\vec{E} = \frac{1}{4\pi\varepsilon}\int \frac{x\,dp}{p^2}\hat{P_2}$ → $q = x\,l$ → muatan kedistribusi pada Penggaris.

3). $\vec{E} = \frac{1}{4\pi\varepsilon}\iint \frac{\sigma\,da}{p^2}\hat{p_0}$


luas permukaan.

4). $\vec{E} = \frac{1}{4\pi\varepsilon}\iiint \frac{\rho_Q\,\sigma}{p^2}\hat{P_0}$

$\int_{\text{surface}}$ $\int_{\text{vol}} (+)\frac{k}{P_2} = \frac{1}{4\pi\varepsilon^2}$

Gelombang bunyi

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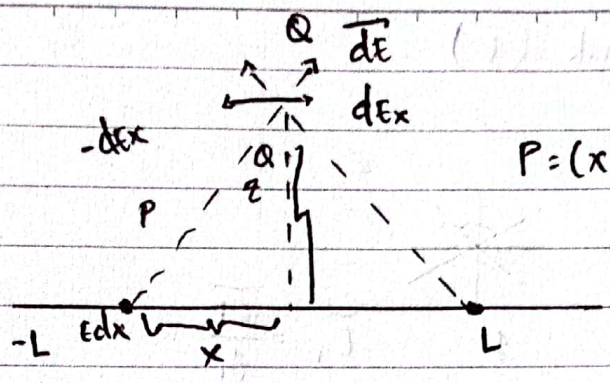
1).




$P = (x^2 + z^2)^{1/2}$

$\vec{dE} = dEy + dEx$

$\vec{dE} = dEy$

$\vec{dE}y = dE \cos\theta$

$\vec{E} = \frac{1}{4\pi\varepsilon} \int_{-L}^{L} \frac{a\,dl}{p^2} \cos\theta$ $dx$

$= \frac{2}{4\pi\varepsilon_0} \int_0^L \frac{x\,dx}{(x^2 x^2)} \cos\theta$

$\vec{E} = \frac{2\lambda z}{4\pi\varepsilon_0} \int_0^L \frac{dx}{(x^2+z^2)^{3/2}}$

$\int \frac{dx}{(x^2+z^2)^{3/2}} = \frac{x}{z^2\sqrt{x^2+z^2}}$

$\vec{E} = \frac{2\lambda z}{4\pi\varepsilon_0} \left( \frac{x}{z^2\sqrt{x^2+z^2}} \right) \Big|_0^L = \square \left[ \frac{1}{z^2\sqrt{L^2+z^2}} - \frac{0}{z^2\sqrt{0+z^2}} \right]$

$= \square \left[ \frac{L}{z^2\sqrt{L^2+z^2}} \right]$

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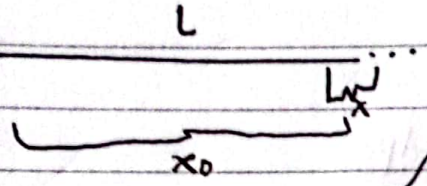
2).




$$\vec{E} = \frac{1}{4\pi\varepsilon_0}\int_0^L \frac{x\,dx}{(x_0-x)^2}$$

$$\int \frac{dx}{x^2} = \int x^{-2}\,dx = 1x^{-1}\Big|_0^L$$

$$\vec{E} = \frac{1}{4\pi\varepsilon_0}\lambda\int_0^L (x_0-x)^{-2}\,dx$$

$$= \square\left((x_0-x)^{-1}\right)\Big|_0^L$$

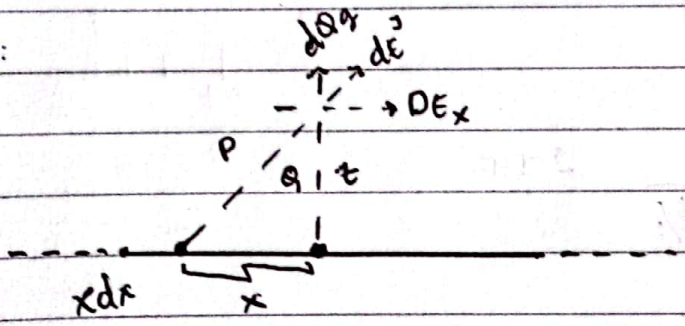
$$= \square\left(\frac{1}{(x_0-x)}\right)\Big|_0^L$$

$$= \square\left(\frac{1}{(x_0-L)} - \frac{1}{(x_0-0)}\right)$$

$$= \square\left[\frac{x_0-(x_0-L)}{x_0(x_0-L)} = \frac{L}{x_0(x_0-L)}\right]$$

Contoh :

3).




$$\text{tangan} = \frac{1}{\cos^2\theta}$$

$$\vec{E} = \vec{E}x + \vec{E}y$$

$$\vec{E} = \frac{1}{4\pi\varepsilon_0}\int_{\infty}^{\infty} \frac{x\,dx}{p^2}\cos\theta$$

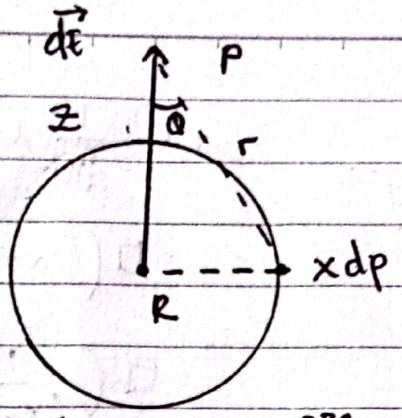
$$\cos\theta = \frac{z}{p} \rightarrow (V) = \frac{z}{\cos\theta}$$

$$\tan\theta = \frac{x}{z}. \quad x = z\tan\theta$$

$$dx = \frac{z}{\cos^2\theta} \rightarrow x = \infty$$

$$\theta = -\pi/2$$

$$x = \infty \rightarrow \theta = \pi/2$$




$$\vec{E} = \frac{1}{4\pi\varepsilon_0} \int \frac{El}{4\pi\varepsilon_0 (z^2 + R^2)^{3/2}} \int_0^{2\pi R} dl$$

$$= \square \; L \Big|_0^{2\pi R}$$

$$= \square \; (2\pi R)$$

$$= \frac{2\lambda}{4\pi\varepsilon_0 (z^2 + R^2)^{3/2}} \quad 2\pi R$$