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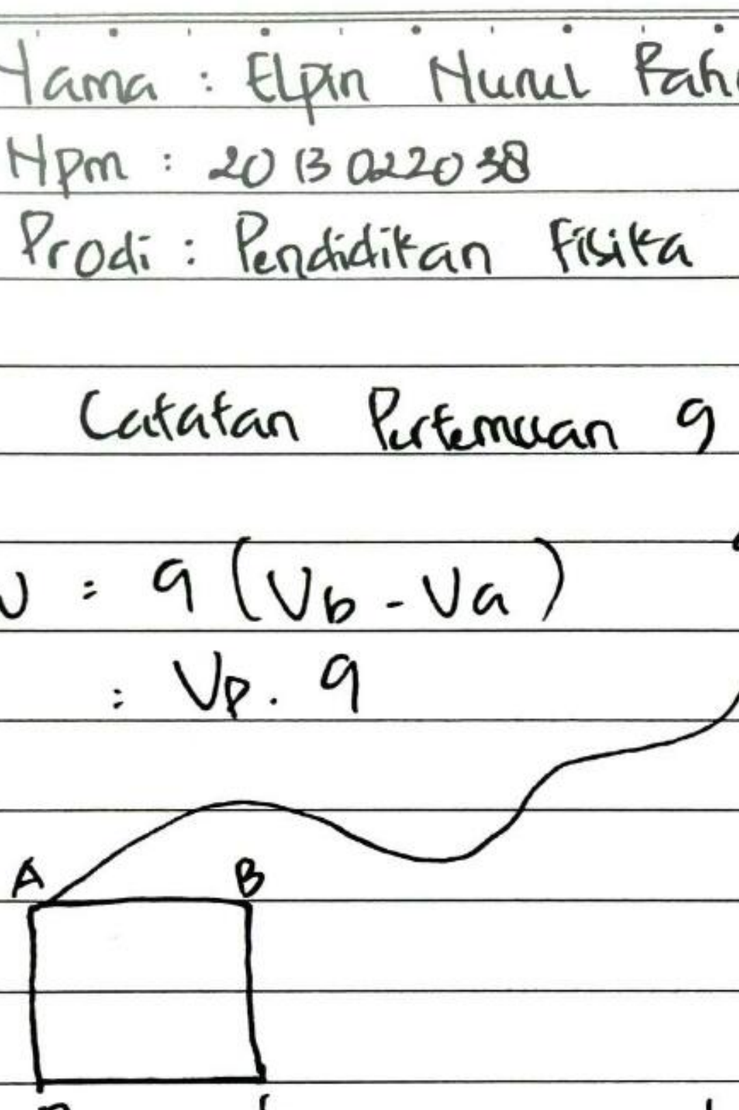
Prodi : Pendidikan Fisika B

Catatan Pertemuan 9

$W = q(V_b - V_a)$

$: V_p \cdot q$



$\rightarrow \frac{1}{4\pi\varepsilon_0} \frac{0}{P_{12}} = 0$

$W_1 - V_p \cdot q_1 = 0$

$W = \frac{1}{4\pi\varepsilon_0} \sum_{i=1}^{n} q_i \sum_{\substack{i \neq j \\ j > i}} \frac{q_j}{P}$

$W = \frac{1}{2} \frac{1}{4\pi\varepsilon_0} \sum_{i=j}^{n} q_i \sum_{i=j} \frac{q_i}{P}$

$W = \frac{1}{2} \sum_{i=j}^{n} q_i \sum_{\substack{i \neq j \\ j > i}} V_p$

$W = \frac{1}{2} V_p \cdot q$

$W = \frac{1}{2} \sum_{i=1}^{n} q_i \left[\sum_{\substack{i=1 \\ j \neq i}} \frac{1}{4\pi\varepsilon_0} \frac{q_j}{P_{ij}} \right]$ → muatan diskrit

Untuk muatan kontinu

$W = \frac{\varepsilon_0}{2} \int_V E^2 \, dv$

$\rightarrow W = \frac{1}{2} \int_V \sigma V \, d\vec{a}$

$\int dv = \int_0^{\ell} \int_0^{2\pi} \int_0^{\pi} r^2 \sin\theta \, d\theta \, d\phi \, dr$

$\cdot 4\pi \int_0^{\ell} r^2 \, dr$

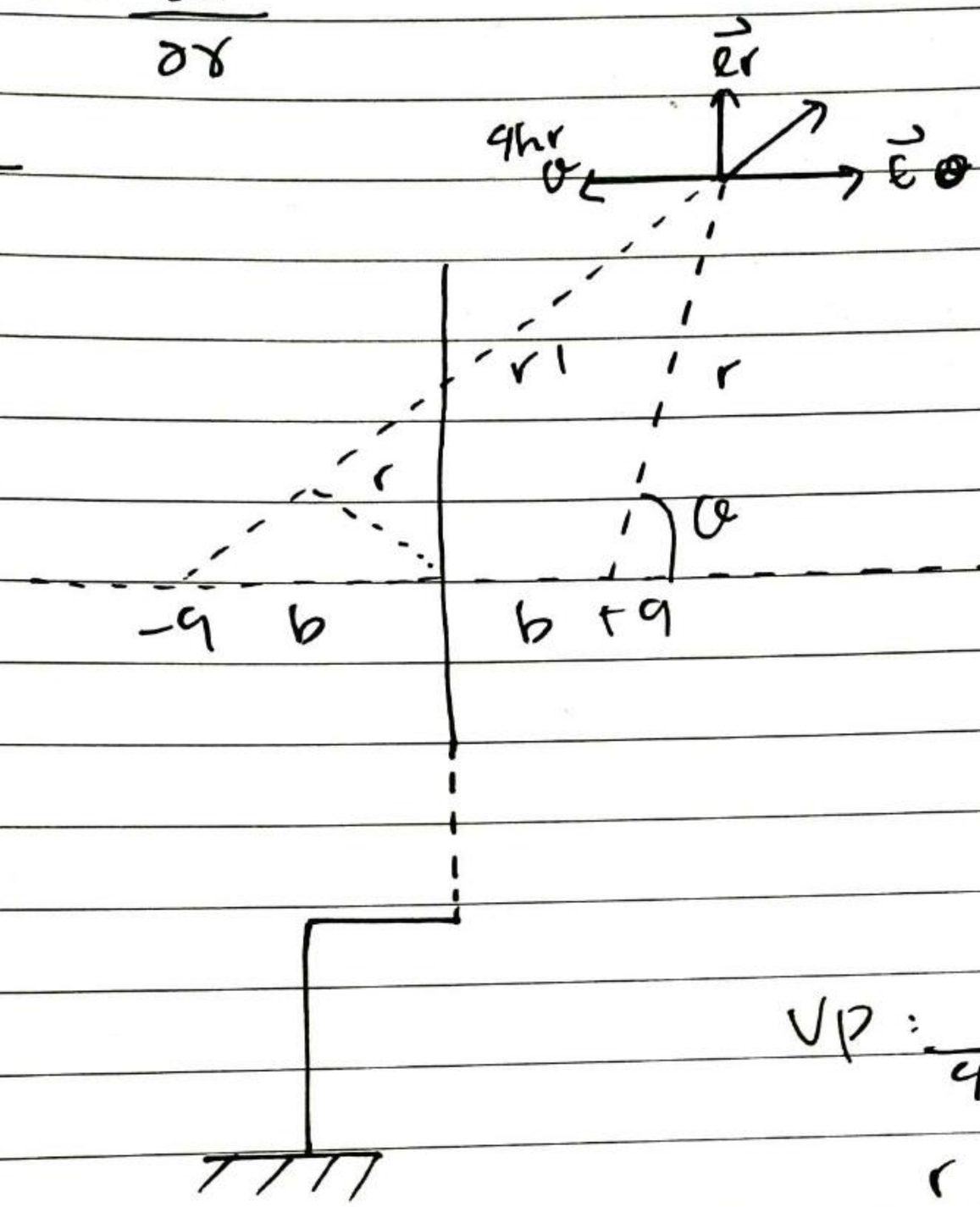
$\boxed{W = \frac{1}{2} \iint \sigma V \, da}$

Metode Pemantuan Potensial

$$\vec{E}_0 = \frac{1}{4} \frac{2V}{2\theta}$$

$$\vec{E}_P = -\frac{\partial V}{\partial r}$$

$$\frac{\Delta V}{\Delta r}$$



$$V_P = \frac{1}{4\pi\varepsilon_0}\left[\frac{q}{r} - \frac{q}{r_1}\right]$$

$r = \ldots ?$

$$\vec{E} = \frac{-q}{4\pi\varepsilon_0} \frac{2}{\partial r}\left[\frac{1}{r} - \frac{1}{(r^2 + 4h^2 + 4hr\cos\theta)^{\frac{1}{2}}}\right]$$

$$= -\frac{q}{4\pi\varepsilon_0}\left[\frac{1}{r^2} - \frac{\partial r + 4h\cos\theta}{(r^2 + 4h^2 + 4hr\cos\theta)^{3/2}}\right]$$

$$r' = \left[r^2 + q^2 + 2qr\cos\theta\right]^{\frac{1}{2}}$$

$$= -\frac{dv}{dr}\left(r^2 + 4h^2 + 4hr\cos\theta\right)^{-\frac{1}{2}}$$

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$$= +\frac{1}{2}\left(\frac{2r + 4h\cos\theta}{(r^2 + 4h^2 + 4hr\cos\theta)^{\frac{3}{2}}}\right)$$

$$E_\theta = -\frac{1}{r}\frac{\partial V}{\partial \theta}$$

$$= -\frac{1}{r}\frac{q}{4\pi\varepsilon_0}\frac{d}{d\theta}\left(\frac{1}{r} + \frac{1}{(r^2 + 4h + 4hr\cos\theta)^{\frac{1}{2}}}\right)$$

$$= +\frac{q}{4\pi\varepsilon_0 r}\left[+\frac{1}{2}\frac{4hr\sin\theta}{(r^2 + 4h + 4hr\cos\theta)^{\frac{3}{2}}}\right]$$

$$= \frac{q}{4\pi\varepsilon_0 r}\left[\frac{2hr\sin\theta}{(r^2)^{\frac{3}{2}}}\right]$$