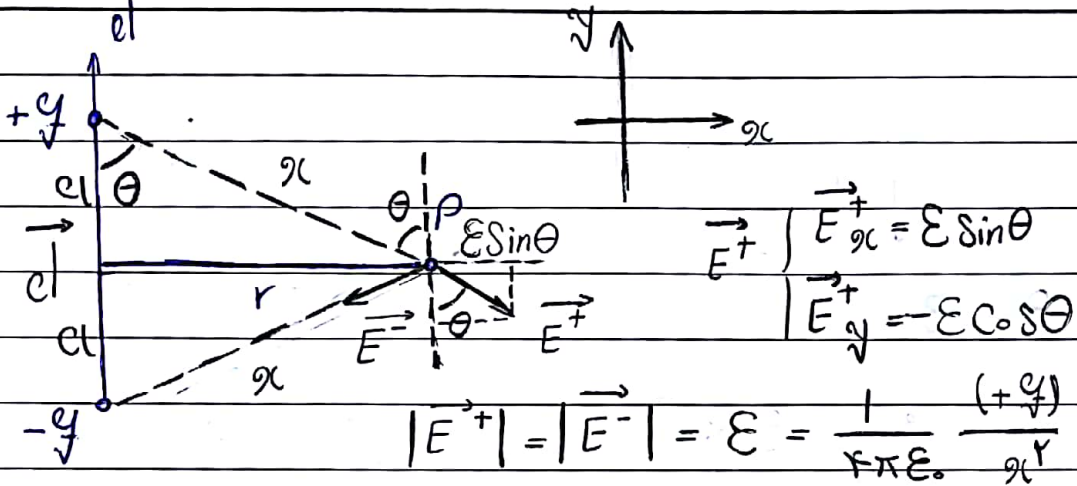


Subject: \_\_\_\_\_  
 Year: \_\_\_\_\_ Month: \_\_\_\_\_ Day: \_\_\_\_\_



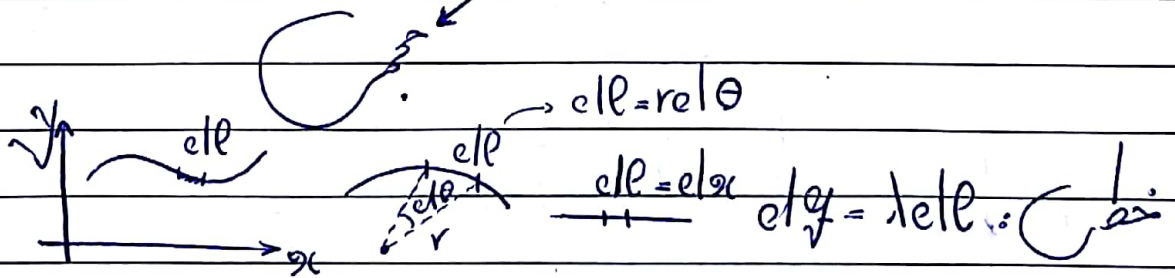
$$\vec{E} = \vec{E}^+ + \vec{E}^- = [\epsilon \sin \theta \hat{x} - \epsilon \cos \theta \hat{y}] + [-\epsilon \sin \theta \hat{x} - \epsilon \cos \theta \hat{y}]$$

$$= -2 \epsilon \cos \theta \hat{y} = -2 \cdot \frac{1}{4\pi\epsilon_0} \cdot \frac{2aq}{(a^2+r^2)} \cdot \left(\frac{a}{\sqrt{a^2+r^2}}\right) \hat{y} =$$

$$\frac{-2aq \hat{y}}{4\pi\epsilon_0 (a^2+r^2)^{3/2}}$$

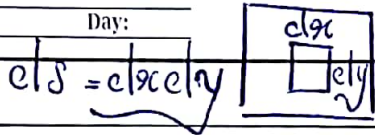
if  $r \gg a \rightarrow r^3$

۳- میدان الکتریکی ناشی از توزیع بار پیوسته



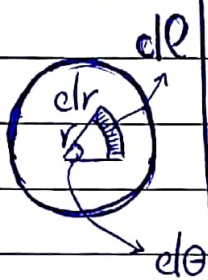
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Subject: \_\_\_\_\_  
 Year: \_\_\_\_\_ Month: \_\_\_\_\_ Day: \_\_\_\_\_

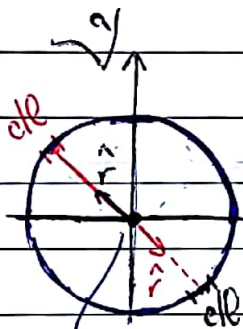
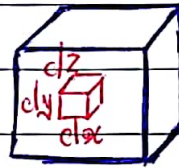


$dV = dx dy dz$  :  $dV = \rho dx dy dz$  :  $dV = \rho dx dy dz$

$dV = \rho dx dy dz$   
 $dV = \rho r dr d\theta dz$



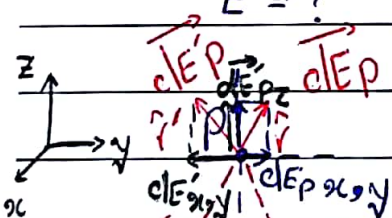
$dV = \rho dx dy dz$  :  $dV = \rho r dr d\theta dz$



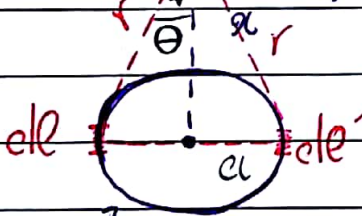
مثال ۱:  $\epsilon_0 \int \frac{\rho(r')}{r^2} dV'$

چون مختصات خطی است و بردارهای یک هم اندازه است  
 در خلاف جهت هستند قطعاً E در میدان نقاط مغز است.

$\vec{E} = ?$



مثال ۲: بردارهای r حول نقطه P یک مخروط ایجاد می کنند



$dV' = \lambda dA dz \rightarrow d\vec{E}_P = \frac{\lambda dA dz}{4\pi\epsilon_0 r^2} \hat{r}$

$d\vec{E}_P$  و  $d\vec{E}_P'$  در محور z و y و x تجزیه می کنیم.

$(\epsilon_0/m) \leftarrow \lambda$  است

$\vec{E}_P = \frac{\lambda dA dz}{4\pi\epsilon_0 r^2} \hat{r}$

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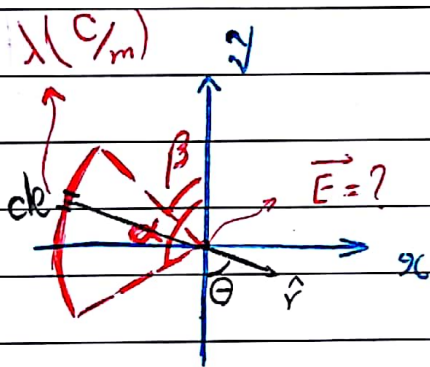
Subject: \_\_\_\_\_  
 Year: \_\_\_\_\_ Month: \_\_\_\_\_ Day: \_\_\_\_\_

$$\vec{dE}_p = \begin{cases} \epsilon \cos\theta \hat{z} \\ \epsilon \sin\theta (\hat{R}) \end{cases}$$

$$\vec{dE}'_p = \begin{cases} \epsilon \cos\theta \hat{z}' \\ \epsilon \sin\theta (-\hat{R}) \end{cases}$$

$$\vec{dE}_p + \vec{dE}'_p = 2\epsilon \cos\theta \hat{z} \rightarrow \vec{E}_p = \int \vec{dE}_z = \int \epsilon \cos\theta \hat{z} =$$

$$\frac{\hat{z} \lambda \cos\theta}{4\pi\epsilon \cdot r^2} \int_{2\pi a} dl = \hat{z} \lambda 2\pi a \frac{2c}{4\pi\epsilon \cdot (a^2 + a^2)^{3/2}}$$



$$dl = \lambda dl \quad d\vec{E} = \frac{\lambda dl}{4\pi\epsilon \cdot r^2} \hat{r}$$

$$\hat{r} = \begin{cases} r_x = 1 \times \sin\theta \hat{x} \\ r_y = 1 \times \cos\theta \hat{y} \end{cases}$$

$$\vec{E}_T = \int \vec{dE} = \frac{\lambda}{4\pi\epsilon \cdot R^2} \int_{\beta}^{\alpha} (\sin\theta \hat{x} - \cos\theta \hat{y}) dl =$$

$$\frac{\lambda}{4\pi\epsilon \cdot R} \int_{\beta}^{\alpha} (\sin\theta \hat{x} - \cos\theta \hat{y}) d\theta = \frac{\lambda}{4\pi\epsilon \cdot R} \left[ -\cos\theta \Big|_{\beta}^{\alpha} \hat{x} - \sin\theta \Big|_{\beta}^{\alpha} \hat{y} \right]$$

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