	UNIVERSIDAD DE SAN CARLOS DE GUATEMALA	FÍSICA 2 C	NOTA:
	FACULTAD DE INGENIERÍA		
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	INGA. CLAUDIA CECILIA CONTRERAS FOLGAR DE ALFARO	AUX. ANGEL QUIM	

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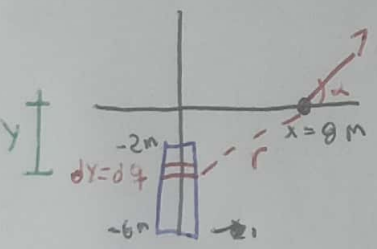
Hoja de trabajo #1

Problema 1

$Q = 24\ nC$



$r^2 = (8)^2 + (y)^2$ $\quad \sin\alpha = \frac{y}{\sqrt{64+y^2}}$

$\lambda = \frac{Q}{L} = \frac{24}{4} = 6\ nC/m$

$dq = \lambda\, dy$ $\quad dE = \frac{K\,dq}{r^2} = \frac{K\lambda\, dy}{64+y^2}$ $\quad \vec{E} = \int_{-6}^{-2} \frac{K\lambda\, dy}{64+y^2} * \frac{y}{(64+y^2)^{1/2}}$

$dE_y = dE \sin\alpha$ $\quad \vec{E} = K\lambda \int_{-6}^{-2} \frac{y\,dy}{(64+y^2)^{3/2}} = -1.148\ \frac{N}{C}$ $\quad |\vec{E}| = 1.15\ \frac{N}{C}$

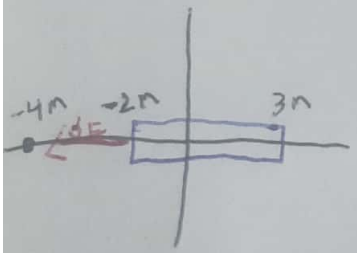
R// $1.15\ \frac{N}{C}$

Problema 2

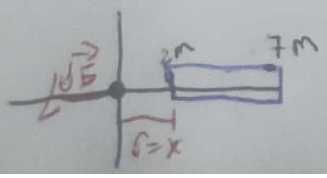
$\lambda = 4\ nC/m$

$dq = \lambda\, dx$

$dE = \frac{K\,dq}{r^2} = \frac{K\lambda\, dx}{x^2}$



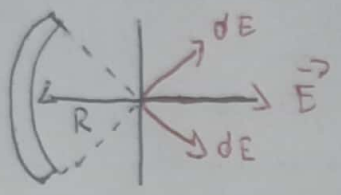
$E = K\lambda \int_2^7 \frac{dx}{x^2} = 12.86\ \frac{N}{C}\ (-\hat{i})$



R// $|\vec{E}| = 13\ \frac{N}{C}\ (-\hat{i})$

Problema 3

$Q = 10\,mC \quad R = 0.15\,m$



Por simetria se anula

$$\lambda = \frac{Q}{L} = \frac{Q}{S} = \frac{Q}{R\frac{\pi}{2}} = 4.244 \times 10^{-3}\ \frac{C}{m}$$

$$\lambda = \frac{dq}{Rd\theta} \qquad dq = \lambda R d\theta \qquad dE = \frac{k dq}{r^2} = \frac{k\lambda R d\theta}{R^2} = \frac{k\lambda d\theta}{R}$$

$$\vec{E} = 2\int_0^{\pi/2} \frac{k\lambda \cos\theta d\theta}{R} = 3.6 \times 10^9\ \frac{N}{C}\,(+\hat{i})$$

$$q_0 = \frac{\vec{F_e}}{E} = \frac{0.1}{3.6\times10^9} = 27.78 \times 10^{-12}$$

R// $3.6 \times 10^9\ \frac{N}{C}\,(+\hat{i})$

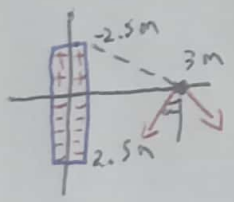
$q_0 = 27.78 \times 10^{-12}\,C$

Problema 4

$Q = 15\,nC$

Por simetría las componentes x se anulan

$$\lambda = \frac{Q}{L} = \frac{15}{2.5} = 6\ \frac{nC}{m}$$



$$dq = \lambda dy \qquad r^2 = (3)^2 + y^2 \qquad \cos\alpha = \frac{y}{9+y^2}$$

$$dE = \frac{k dq}{r^2} = \frac{k\lambda dy}{9+y^2} \qquad \vec{E} = 2\int_0^{2.5} \frac{k\lambda dy}{9+y^2} \cdot \frac{y}{9+y^2}\,(-\hat{j})$$

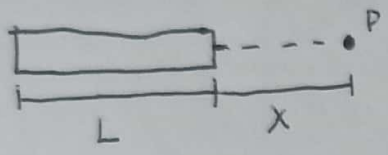
$$\vec{E} = \int_0^{2.5} \frac{108\,y\,dy}{(9+y^2)^{3/2}}$$

R// $\int_0^{2.5} \frac{108\,y\,dy}{(9+y^2)^{3/2}}$

Problema 5

$Q = 8\ nC$

$L = 10\ m$



a) $x = 1.50\ m$

$r = 11.5 - x$

Distribución

$$\lambda = \frac{Q}{L} = \frac{8 \times 10^{-9}}{10} = \frac{4}{5}\ \frac{nC}{m}$$

$$dq = \lambda dx \qquad dE = \frac{k\,dq}{r^2} = \frac{k\,\lambda\,dx}{(11.5-x)^2}$$

$$\vec{E_P} = K\lambda \int_0^{10} \frac{dx}{(11.5-x)^2} = 4.17\ \frac{N}{C}$$

b) $F_E = 0.8$

$$q_0 = \frac{F_e}{E} = \frac{0.8}{4.17} = 0.1918\ C = 192 \times 10^{-3}\ C$$

R// a) $4.17\ \frac{N}{C}$

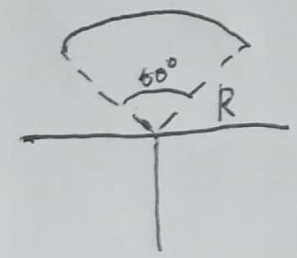
b) $192 \times 10^{-3}\ C$

Problema 6

$Q = 0.471\ nC \qquad \theta = 60° = \pi/3$

$R = 0.18\ m$

Por simetría los componentes "x" se anulan



$$\lambda = \frac{0.471 \times 10^{-1}}{0.18\,\pi/3}$$

$$dE_y = \frac{K|\lambda|R\,d\theta}{R^2} \qquad E_y = 2\int_{\pi/3}^{\pi/2} \frac{K|\lambda|\sin\theta\,dx}{y}$$

$E_y = 125\ \frac{N}{C}(+\hat{j})$

R// $E_y = 125\ \frac{N}{C}(+\hat{j})$