EJERCICIO 1)

a) Carga inicial $Q_0 = C V = 24 \times 10^{-6}\ C$

$$Q_1(t=\infty) = Q_2(t=\infty) = \frac{Q_0}{2}$$

$$\boxed{V_1(t=\infty) = V_2 = \frac{Q_0}{2C} = 6\ V}$$

b) $$\boxed{Q_1(t) = \frac{Q_0}{2}\left(1 + e^{-\frac{2t}{RC}}\right)}$$

$$Q_2(t) = \frac{Q_0}{2}\left(1 - e^{-\frac{2t}{RC}}\right)$$

$$\frac{RC}{2} = 1\ s \qquad t_1 = 1\ s$$

c) $Q_2(t_1) = 7,6 \times 10^{-6}\ C \Rightarrow \boxed{V_2 = 3,8\ V}$

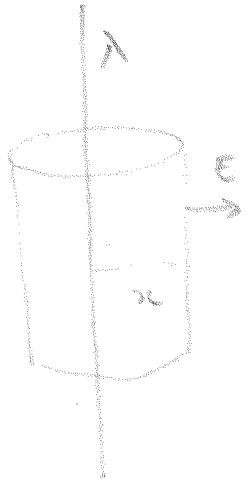
$Q_1(t_1) = 16,4 \times 10^{-6}\ C$

d) Energía disipada $E_I - E_F$

$$E_I = \frac{1}{2}\frac{Q_0^2}{C} \qquad E_F = \frac{1}{2}\left(\frac{Q_1^2}{C} + \frac{Q_2^2}{C}\right)$$

$$\boxed{E_I - E_F = 6,2 \times 10^{-5}\ J}$$

EJERCICIO 2)



a) $2\pi x L E = \frac{\lambda L}{\varepsilon_0}$

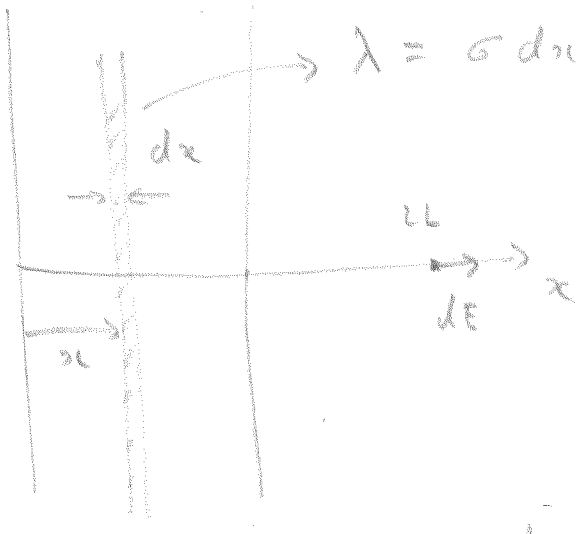
$$E(x) = \frac{\lambda}{2\pi\varepsilon_0 x}$$

b) $V(x) = V(x_0) - \int_{x_0}^{x} E\,dx$ ($V(x_0) = 0$)

$$V(x) = -\frac{\lambda}{2\pi\varepsilon_0}\int_{x_0}^{x}\frac{dx}{x}$$

$$V(x) = \frac{\lambda}{2\pi\varepsilon_0}\ln\left(\frac{x_0}{x}\right)$$

c)



$\lambda = \sigma\,dx$

$$dE = \frac{\sigma\,dx}{2\pi\varepsilon_0(2L-x)}$$

$$E = \frac{\sigma}{2\pi\varepsilon_0}\int_0^L \frac{dx}{(2L-x)}$$

$$\hookrightarrow E = \frac{-\sigma}{2\pi\varepsilon_0}\ln(2L-x)\Big|_0^L$$

$$E = \frac{\sigma}{2\pi\varepsilon_0}\ln(2)$$

Ej 2) d) $E = 0$ por simetría

EJERCICIO 3)

a) $qvB = qE \Rightarrow E = vB$

$$E = 10^4 \text{ V/m} = \frac{V}{D}$$

$$\boxed{V = 2 \times 10^3 \text{ V}}$$

b) 

$$\frac{v^2}{R} = \frac{qvB}{m}$$

$$L = 2R = \frac{2mv}{qB}$$

$$\boxed{L = 11 \text{ cm}}$$