UNIVERSIDAD DE SAN CARLOS
FACULTAD DE INGENIERIA
DEPARTAMENTO DE FISICIA
CURSO DE VACACIONES DICIEMBRE 2022

Firma:

Carné: 20170908 Curso: Física 2 Sección: B

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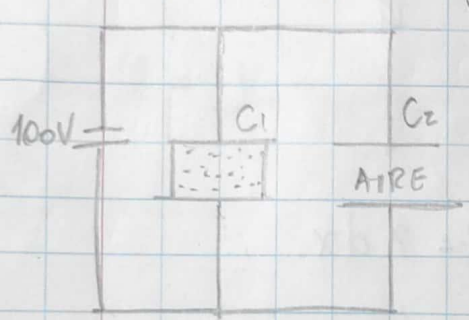
----------Puede iniciar su examen a partir de aquí ----------

Problema 1: $A = 9.00\ cm^2$ $K = 10$

$d = 2.00\ mm.$

$V = 100\ V$

$A = 9\ cm^2 * \left(\frac{1m}{100cm}\right)^2$



$C_{eq} = C_1 + C_2$

$C_1 = \frac{K\varepsilon_0 A}{d}$

$C_1 = \frac{(10)(8.8542*10^{-12})(9*10^{-4})}{2*10^{-3}} = 3.98*10^{-11}$

a)

$C_1 = 39.8*10^{-12}\ F.$ $C_1 = 39.8*10^{-12} F$

$C_2 = \frac{\varepsilon_0 A}{d} = \frac{(8.8542*10^{-12})(9*10^{-4})}{2*10^{-3}} = 3.98*10^{-12}$

$C_2 = 3.98*10^{-12} F$

$C_{eq} = 39.8 + 3.98 = 4.378*10^{-11}\ F. \cong 43.8\ pF.$

b) $U_{E1} = \frac{1}{2} C_1 V^2 = \frac{1}{2}(39.8*10^{-12})(100)^2 = 1.99*10^{-7}\ J.$

$U_{E2} = \frac{1}{2} C_2 V^2 = \frac{1}{2}(3.98*10^{-12})(100)^2 = 1.99*10^{-8}\ J.$

$U_{Et} = 2.189*10^{-7}\ J \cong 218.9*10^{-9}\ J.$

$U_{Et} = 218.9*10^{-9} J$

c) $C_1 = C_2 = 3.98 * 10^{-12}$

$U_e = \frac{1}{2} C V^2 = \frac{1}{2} (3.98 * 10^{-12})(100)^2 = 0.1.99 * 10^{-8} = 0.0199 * 10^{-6}$

$U_e = 0.019 * 10^{-6}$ J //

Problema 2:

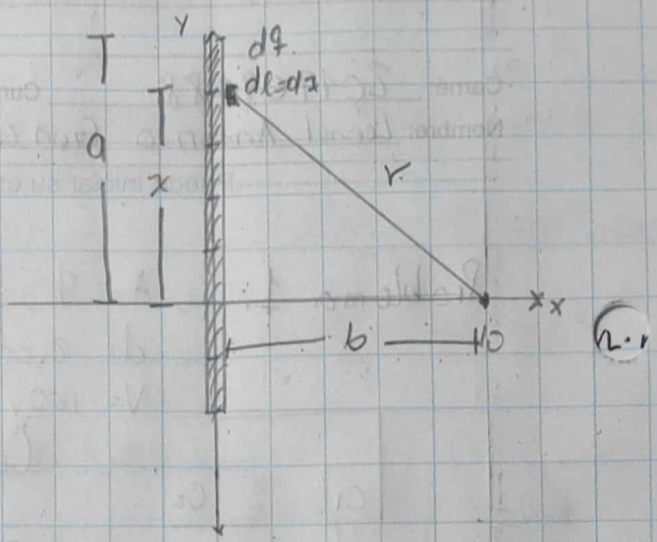
$Q = +45.0\,nC$

a) $Y = -2.00$ cm $Y = 5.00$ cm

$\lambda = \frac{Q}{d} = \frac{45 * 10^{-9}}{0.07} =$

$\lambda = 642.8 * 10^{-9}$ C/m

$\lambda = 643$ n C/m //



b) Potencial en $b = 10.0$ cm

$V = \frac{K dq}{r}$

$dq = \lambda dx$

$r = \sqrt{b^2 + x^2}$

$V = K\lambda \int_{-2}^{5} \frac{dx}{(b^2+x^2)^{1/2}} = K\lambda \left[\ln\left(x + \sqrt{x^2+b^2}\right) \Big|_{-2}^{5} \right]$

$V = K(643n)\left[\ln\left(5 + \sqrt{5^2+(0.1)^2}\right) - \ln\left(-2 + \sqrt{(-2)^2+(0.1)^2}\right) \right]$

$V = 5787\,[8.2947] = 48\,001.86$ V $= 48.001$ kV

$V = 48.001$ kV //

Problema 4:

$L = 0.15\,m$.

$d = 0.0250\,m$.

$V_{ab} = 32\,V$

$T_0 = 20\,^\circ C \rightarrow I = 7\,A$.

$T_0 = 95\,^\circ C \rightarrow I = ?$

$R_{20^\circ C} = 0.600\, R_{95^\circ C}$.

$I_{20^\circ} = \frac{R}{V} =$

$I_{20^\circ} V = R$

$R_{20^\circ} = (7)(32) = 224\,\Omega$

$$R_{20^\circ} = \frac{\rho_{20^\circ} L}{A}$$

a) $$\rho_{20^\circ} = \frac{A R_{20^\circ}}{L} = \frac{\pi (0.0250/2)^2 (224)}{0.15} = 0.7330\,\Omega \cdot m.$$

$\rho_{20^\circ} = 733 * 10^{-3}\,\Omega m$

$$R_{95^\circ} = \frac{224}{0.600} = 373.33\,\Omega$$

$\rho_{20^\circ} = 733 * 10^{-3}\,\Omega \cdot m$

b) $$I = \frac{V}{R} = \frac{32}{373.33} = 0.0857\,A$$

$I = 0.086\,A$.