

Universidad de San Carlos de Guatemala
Facultad de Ingeniería, Departamento de Física
~~Examen~~ de Reposición Física 2, Vacaciones PS 2023
Segundo Examen.

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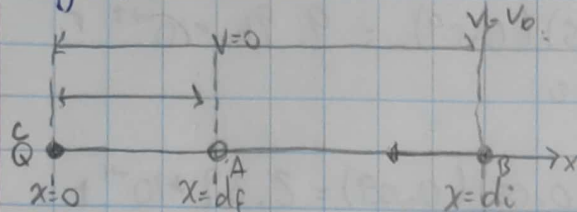
Firma: *[Signature]*

Catedrático: Ing. Eddy Josué Solares

Lección: C

Pregunta 2:

a)



$$Q = 4.50 \mu\text{C} \rightarrow x = 0 \text{ m.}$$

Partícula.

$$m = 6.00 \text{ g.}$$

$$q = 3 \mu\text{C}$$

$$V_0 = 66 \text{ m/s.}$$

$$d_i = 4.20 \text{ cm.}$$

$$V_{AB} = V_A - V_B.$$

$$V_{AB} = -\Delta V.$$

↓

$$W_{FE} = \Delta V q \rightarrow \Delta K = \Delta W \Rightarrow \Delta V = \frac{\Delta K}{q}$$

$$\Delta V = \frac{K_B - K_A}{q}$$

$$\Delta V = \frac{1/2 m V_B^2 - 1/2 m V_A^2}{q} = \frac{m (V_B^2 - V_A^2)}{2q}$$

$$\Delta V = \frac{6 \times 10^{-3} (66)^2}{2 (3 \times 10^{-6})} = 4356000 \text{ V.} = 4.36 \text{ MV.}$$

$$V_{AB} = -\Delta V = -4.36 \text{ MV.}$$

$$V_{ab} = -4.36 \text{ MV.}$$

b)

$$E_{MECB} = E_{MECC}.$$

$$U_B + K_B = U_C + K_C^{no}$$

$$\frac{k q_1 q_2}{r_{BC}} + \frac{1}{2} m V_B^2 = \frac{k q_1 q_2}{r_{CB}}$$

$$k q_1 q_2 - k q_1 q_2 = \frac{1}{2} m V_B^2$$

$$r_{CB} = \frac{k q_1 q_2}{\frac{k q_1 q_2}{r_{BC}} + \frac{1}{2} m V_B^2} = \frac{k (4.5 \mu)(3 \mu)}{\frac{k (4.5 \mu)(3 \mu)}{0.042} + \frac{1}{2} (6 \times 10^{-3})(66)^2}$$

$$r_{CB} = 7.61 \times 10^{-3} \text{ m.}$$

$$r_{CB} = 7.61 \text{ mm.}$$

Pregunta 3. $K_1 = 10$ $a = 0.05 \text{ m}$

$K_2 = 5$ $b = 0.09 \text{ m}$

$K_3 = 12$ $c = 0.02 \text{ m}$

$$C_1 = \frac{K_1 \epsilon_0 A}{d}$$

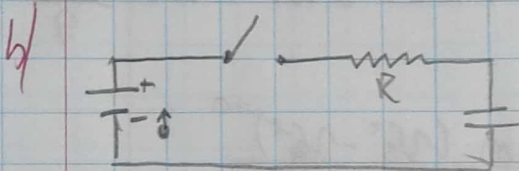
$$a) C_1 = \frac{(10)(8.8542 \times 10^{-12})(0.05)(0.09)}{2(0.02)} = 9.96 \times 10^{-12} \text{ F}$$

$$C_2 = \frac{K_2 \epsilon_0 A}{d} = \frac{(5)(8.8542 \times 10^{-12})(0.05)(0.09)}{0.02} = 9.96 \times 10^{-12} \text{ F}$$

$$C_3 = \frac{K_3 \epsilon_0 A}{d} = \frac{(12)(8.8542 \times 10^{-12})(0.05)(0.09)}{0.02} = 2.39 \times 10^{-11} \text{ F}$$

$$C = 4.38 \times 10^{-11} \text{ F}$$

$$C = 4.38 \times 10^{-11} \text{ F}$$



$$R = 1.40 \text{ G}\Omega$$

$$Q_f = 0$$

$$V_0 = 24 \text{ V}$$

$$\frac{1}{2} C \Delta V^2 = \frac{Q^2}{2C}$$

$$C^2 \Delta V^2 = Q^2$$

$$Q_0 = \sqrt{C^2 \Delta V^2} = \sqrt{(4.38 \times 10^{-11})^2 (24)^2} = 1.0512 \times 10^{-9} \text{ C}$$

$$Q_f = 1051.12 \text{ pC}$$

Pregunta 4.

$$V_0 = 900 \text{ V}$$

$E = 0$ por ser conductor

$$V_{\text{entro}} = 0 \text{ V}$$

entonces V es cero. adentro de la esfera.

$$R = 0.25 \text{ m}$$

$$b) V = \frac{kq}{r} \Rightarrow \frac{rV}{k} = q$$

$$q = 25 \text{ nC}$$

$$q = \frac{(0.25)(900)}{k} = 2.5 \times 10^{-8} \text{ C}$$