HT No: 4

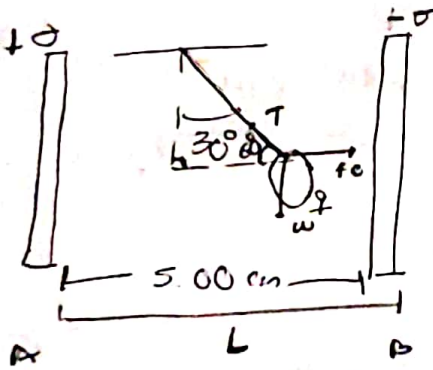
Nombre: Kenel Josue Efrain Ruano Jeronimo

Carné: 202006373 Seccion: "P"

Profesor: Bayron Cuyan Fisica II 1S2022

Aux: José Bolux

Problema 1



$m_{esf} = 1.50\,g$

$q = +8.90 \times 10^{-6}\,C$

$A_p = 10.0\,cm^2$

a) La magnitud de $\vec{E}$ entre las placas.

D.C.L masa q

$$\sum F_{ex} = 0 \qquad \sum F_{ey} = 0$$

$$F_e - T\cos\theta = 0 \qquad T\sin\theta - w = 0$$

$$qE = T\cos\theta \qquad T = \frac{w}{\sin\theta}$$

$$E = \frac{\left(\frac{w}{\sin\theta}\right)\cos\theta}{q}$$

$$E = \frac{w\cos\theta}{q} = \frac{(0.0015)(9.80)\cos(60^\circ)}{(8.90\times10^{-6})}$$

$$E = 953.6 \approx 954\ V/m$$

b) La diferencia potencial placa

$$V_{ab} = E\,L$$

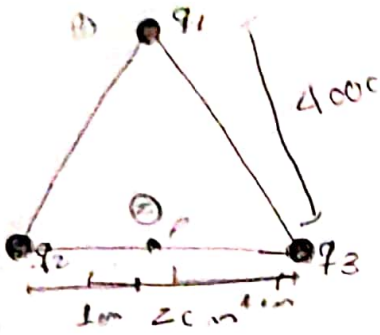
$$V_{ab} = (954)(0.05) = 47.7\ V$$

c) $E = \frac{\sigma}{\varepsilon_0} = \frac{\frac{q}{A}}{\varepsilon_0} \rightarrow q = E\varepsilon_0 A = (954)(8.85\times10^{-12})(0.001)$

$$q = 8.44\ pC$$

d) $\sigma = E\,\varepsilon_0 = (954)(8.85\times10^{-12}) = 8.44\ nC/m^2$

Problema 2



$q_1 = 11.0\,\mu C$

$q_2 = -22.0\,\mu C$

$q_3 = -33.0\,\mu C$

$V_f = 0$

a) $V_0 = \frac{K q_1 q_2}{r_{12}} + \frac{K q_1 q_3}{r_{13}} + \frac{K q_2 q_3}{r_{23}}$

$V_0 = K\left[\frac{(11.0\mu)(-22.0\mu)}{(0.04)} + \frac{(11.0\mu)(-33.0\mu)}{(0.04)} + \frac{(-22.0\mu)(-33.0\mu)}{(0.02)}\right]$

$V_0 = K[-6.05\,n + 9.075\,n + 36.3\,n]$

$V_0 = 191\ J$

b)

$V_p = V_{p1} + V_{p2} + V_{p3}$

$V_p = K\left[\frac{11.0\mu}{1.5\times10^{-1}}\left[\frac{-22.0\mu}{0.01} - \frac{33.0\mu}{0.01}\right]\right] = -46.9\times10^6$ Volt

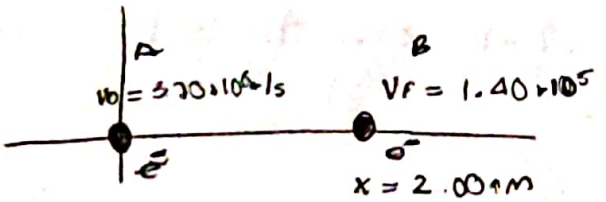
c) $V_1 = K\left[\frac{-22.0\mu}{0.04} - \frac{33.0\mu}{0.09}\right] = -12.4\times10^6$ Volt

$W_{FC} = q_0 V_{AB} \rightarrow q_1 V_{AB} \rightarrow q_1[V_A - V_B] \rightarrow q_1[V_1 - V_2]$ (1 = 2)

$W_{Fe} = (11.0\mu)[-12.4\times10^6 - (-4.9.5\times10^6)]$

$W_{Fe} = 408.4\ J$

Problema 3



$q_0 V_{AB} = \Delta K$

$q_e V_{AB} = K_f - K_0$

$q_e V_{AB} = \frac{1}{2} m_e V_f^2 - \frac{1}{2} m_e V_0^2$

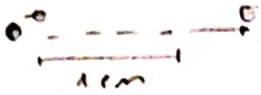
$V_{AB} = \frac{\frac{1}{2}(9.11\times10^{-31})\left[(1.40\times10^5)^2 - (3.70\times10^5)^2\right]}{q_e}$

$V_{AB} = \frac{-6.22686725\times10^{-18}}{-1.60\times10^{-19}}$

$V_{AB} = 38.9\ V$

Problema 4

a)



$$V_{AB} = EL = (5.90 \times 10^3)(0.01) = 59.0\ V$$

b)

$$q_0 V_{AB} = \Delta K$$

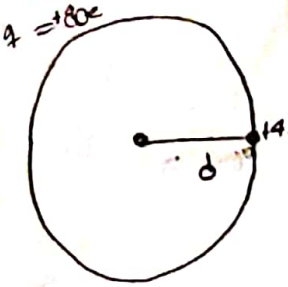
$$q_e V_{AB} = K_f - K_0$$

$$q_e V_{AB} = \frac{1}{2} m V_f^2$$

$$V_f = \sqrt{\frac{2 q_e V_{AB}}{m_e}}$$

$$V_f = \sqrt{\frac{2(1.60 \times 10^{-19})(59)}{9.11 \times 10^{-31}}} = 4.55 \times 10^6\ m/s$$

Problema 5



Carga 1 = +4e

$Masa_{+4e} = 13.28 \times 10^{-27}\ kg$

$d = 2.00 \times 10^{-10}$

$v_0 = 1.00 \times 10^7\ m/s$

a)

$$W_{fe} = \Delta E_U$$

$$0 = E_f - E_0$$

$$E_0 = E_f$$

$$E_1 = E_2$$

$$K_1 + U_1 = K_2 + U_2$$

$$\frac{1}{2} m_1 v_1^2 + \frac{K q_1 q_2}{r_{12}} = \frac{K q_1 q_2}{r_F}$$

$$r_F = \frac{K q_1 q_2}{\frac{1}{2} m_1 v_1^2 + \frac{K q_1 q_2}{r_{12}}} = \frac{K(4e)(80e)}{\frac{1}{2}(13.28 \times 10^{-27})(1.00 \times 10^7)^2 + \frac{K(4e)(80e)}{(2.00 \times 10^{-10})}}$$

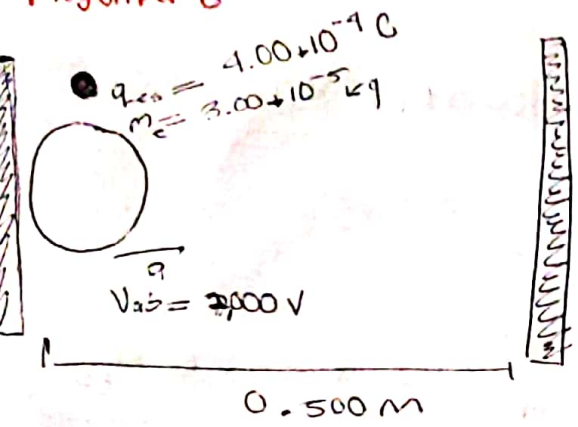
$$r_F = \frac{7.3728 \times 10^{-73}}{6.6436864 \times 10^{-13}} = 1.11 \times 10^{-13}\ m$$

$1.109745337 \times 10^{-13}$

b)

$$U = \frac{K q_1 q_2}{r} = \frac{K(4e)(80e)}{(1.11 \times 10^{-13})} = 6.6A \times 10^{13}\ J$$

Pregunta 6



a)

$$q V_{ab} = \Delta K$$

$$q V_{ab} = K_f - K_0$$

$$q V_{ab} = \frac{1}{2} m_e V_f^2$$

$$V_f = \sqrt{\frac{2 q V_{ab}}{m_e}}$$

$$V_f = \sqrt{\frac{2(4.00 \times 10^{-9})(7{,}000)}{3.00 \times 10^{-5}}} = 432.05 \text{ m/s}$$

b)

$$W_1 = q V_{ab} = (4.00 \times 10^{-9})(7{,}000) = 2.80 \text{ J}$$

c)

$$V_{ab} = E L$$

$$E = \frac{7{,}000}{0.500} = 14.0 \text{ k [V/m]}$$