



UNIVERSIDAD DE SAN CARLOS DE GUATEMALA
FACULTAD DE INGENIERÍA
ESCUELA DE CIENCIAS
DEPARTAMENTO DE FÍSICA

F2 B	Nota:
DIC.2022	
AUX. CESAR FERNANDEZ	

TAREA
HOJA DE TRABAJO
EXAMEN CORTO

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No.
1

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Capítulo 21. Carga Eléctrica y Campo Eléctrico

P 21.4

#1

$$m = 10.8g$$

$$mat = 197g/mol$$

$$nat = 79$$

a) # Protones

$$10.8g \times \frac{1mol}{197g} \times \frac{6.022 \times 10^{23}}{1mol} \times \frac{79 \text{ prot}}{1 \text{ nat}} = 2.61 \times 10^{24}$$

$$Carga \text{ positiva} = (2.61 \times 10^{24} p)(1.6022 \times 10^{-19} C/p) = 4.18 \times 10^5 C$$

$$\# \text{ Protones: } 2.61 \times 10^{24} p$$

$$Q+ = 4.18 \times 10^5 C$$

b) # electrones = # Protones

$$\# \text{ electrones: } 2.61 \times 10^{24} e$$

P. 21.11

#2

a) $1 \oplus$ $2 \oplus$ $F = ma$

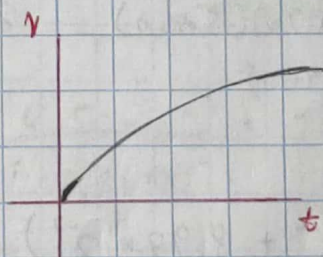
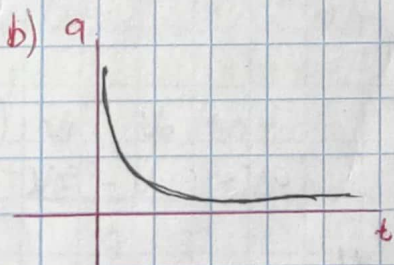
$$2.50mm$$

$$a = \frac{F}{m}$$

$$F_e = \frac{k q_1^2}{r^2} = \frac{9 \times 10^9 (1.6 \times 10^{-19})^2}{(0.00250)^2} = 3.69 \times 10^{-23} N$$

$$a = \frac{3.69 \times 10^{-23}}{1.67 \times 10^{-27}} = 22074.2 m/s^2$$

$$a = 2.21 \times 10^4 m/s^2$$



$$q_1 = +3.00 \mu\text{C}$$

$$x = 0$$

$$F_1 = 7.00 \text{ N}, -\hat{i}$$

$$q_2 = -5.00 \mu\text{C}$$

$$x = 0.200 \text{ m}$$

$$q_3 = -8.00 \mu\text{C}$$

$$\vec{F}_1 = \vec{F}_{12} + \vec{F}_{13}$$

$$-7 = \frac{k |q_1| |q_2|}{0.2^2} + \vec{F}_{13}$$

$$\vec{F}_{13} = -7 - 9 \times 10^9 (3 \times 10^{-6}) (5 \times 10^{-6}) / 0.2^2$$

$$\vec{F}_{13} = -10.375 \text{ N}$$

$$|F_{13}| = \frac{k |q_1| |q_3|}{r_{13}^2}$$

$$r_{13} = \sqrt{\frac{9 \times 10^9 (8 \times 10^{-6}) (3 \times 10^{-6})}{10.375}} = 0.144 \text{ m}$$

$$x = -0.144 \text{ m}$$

$$q_1 = -1.50 \text{ nC}$$

$$y = -0.600 \text{ m}$$

$$q_2 = +3.20 \text{ nC}$$

$$y = 0$$

$$q_3 = +5.00 \text{ nC}$$

$$y = -0.400 \text{ m}$$

$$F_{13} = \frac{k |q_1| |q_3|}{r_{13}^2} = \frac{9 \times 10^9 (1.50 \text{ n}) (5.00 \text{ n})}{(0.200)^2}$$

$$F_{13} = 1.69 \times 10^{-6} \text{ N}$$

$$F_{23} = \frac{9 \times 10^9 (3.20 \text{ n}) (5.00 \text{ n})}{(0.400)^2} = 8.97 \times 10^{-7} \text{ N}$$

$$F_{12} = 0$$

$$F_{ry} = -(1.69 \times 10^{-6} + 8.97 \times 10^{-7}) = -2.59 \times 10^{-6} \text{ N}$$

$$|F_r| = 2.59 \times 10^{-6} \text{ N (down)}$$

$$\vec{E} = 2.75 \times 10^3 \text{ N/C}$$

$$q_{\text{proton}} = 1.60 \times 10^{-19} \text{ C}$$

$$a) \vec{E} = \frac{F}{q} \rightarrow F = Eq$$

$$F = (2.75 \times 10^3)(1.60 \times 10^{-19})$$

$$F = 4.4 \times 10^{-16} \text{ N}$$

$$F = 4.4 \times 10^{-16} \text{ N}$$

$$b) F = ma \rightarrow a = \frac{F}{m} = \frac{4.4 \times 10^{-16}}{1.67 \times 10^{-27}}$$

$$a = 2.63 \times 10^{11} \text{ m/s}^2$$

$$a = 2.63 \times 10^{11} \text{ m/s}^2$$

$$c) V_f = V_0 + at$$

$$t = 1 \mu\text{s}$$

$$V = (2.63 \times 10^{11})(1 \times 10^{-6}) = 263473.05 \text{ m/s}$$

$$V = 2.63 \times 10^5 \text{ m/s}$$

$$V = 4.50 \times 10^6 \text{ m/s}$$

$$q_{\text{proton}} = 1.60 \times 10^{-19} \text{ C}$$

$$x = 3.20 \text{ cm}$$

$$a) V_f^2 = V_0^2 + 2a \Delta x$$

$$-V_0^2 = a \cdot 2 \Delta x \rightarrow a = \frac{-(4.50 \times 10^6)^2}{2(0.0320)}$$

$$E = \frac{F}{q} = \frac{ma}{q} = \frac{(1.67 \times 10^{-27})(3.16 \times 10^{14})}{1.60 \times 10^{-19}}$$

$$a = -3.16 \times 10^{14} \text{ m/s}^2$$

$$E = 3.3 \times 10^6 \text{ N/C} \quad +x$$

$$E = 3.3 \times 10^6 (+x) \text{ N/C}$$

$$b) V_f = V_0 + at$$

$$\frac{V_f^2 - V_0^2}{2a} = t$$

$$a$$

$$t = \frac{-V_0}{a} = \frac{4.50 \times 10^6}{3.16 \times 10^{14}} = 1.42 \times 10^{-8}$$

$$t = 1.42 \times 10^{-8} \text{ s}$$

$$a) E_e = \frac{m_e}{m_p} E_p = \frac{9.10 \times 10^{-31}}{1.67 \times 10^{-27}} (3.3 \times 10^6) = 1798.2 \text{ N/C}$$

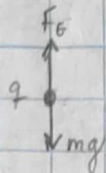
$$E_e = 1.80 \times 10^3 \text{ N/C}$$

$$m = 1.45g$$

$$E = 650 \text{ N/C}$$

$$F = mg$$

a)



$$F = Eq_0$$

$$mg = Eq_0$$

$$q_0 = \frac{mg}{E}$$

$$q_0 = \frac{(1.45 \times 10^{-3})(9.80)}{650} = 2.19 \times 10^{-5} \text{ C}$$

$$q = -21.9 \mu\text{C}$$

$$b) F_E = 19|E| = eE$$

$$E = \frac{mg}{e} = \frac{(1.67 \times 10^{-27})(9.80)}{1.602 \times 10^{-19}} = 1.02 \times 10^{-7} \text{ N/C}$$

$$E = 1.02 \times 10^{-7} \text{ N/C}$$

$$x = 1.60 \text{ cm}$$

$$t = 3.20 \times 10^{-6} \text{ s}$$

$$m_p = 1.67 \times 10^{-27}$$

$$E = \frac{F}{|q|} \Rightarrow a = \frac{Eq_e}{m_p}$$

$$a) x - x_0 = v_0 t + \frac{1}{2} a t^2$$

$$\frac{2(x - x_0)}{t^2} = a$$

$$\frac{2(x - x_0)}{t^2} = \frac{Eq_e}{m_p}$$

$$E = \frac{2(x - x_0) m_p}{q_e t^2} = \frac{2(0.0160)(1.67 \times 10^{-27})}{(1.60 \times 10^{-19})(3.20 \times 10^{-6})^2} = 32.6 \text{ N/C}$$

$$E = 32.6 \text{ N/C}$$

$$b) v_f = v_0 + at$$

$$v_f = \frac{Eq_e}{m_p} t = \frac{(32.6)(1.60 \times 10^{-19})}{(1.67 \times 10^{-27})} (3.20 \times 10^{-6}) = 1.00 \times 10^4 \text{ m/s}$$

$$v = 1.00 \times 10^4 \text{ m/s}$$