



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.  
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$$d = 2.6 \text{ mm}$$

$$q = 420 \text{ C}$$

$$t = 80 \text{ min}$$

$$e = 5.8 \times 10^{28}$$

$$a) I = \frac{q}{t} = \frac{420 \text{ C}}{80 \text{ min} \times 60 \text{ s}} = 0.0875 \text{ C/s}$$

$$I = 0.0875 \text{ C/s}$$

$$b) I = nqA\vec{v} \Rightarrow \vec{v} = \frac{I}{nqA}$$

$$\vec{v} = \frac{0.0875}{(5.8 \times 10^{28})(1.6 \times 10^{-19})(\pi(1.3 \times 10^{-3})^2)} = 1.78 \times 10^{-6} \text{ m/s}$$

$$v = 1.78 \times 10^{-6} \text{ m/s}$$

$$I = 5.00 \text{ A}$$

$$d = 2.05 \text{ mm}$$

$$n = 8.5 \times 10^{28} \text{ e}^-/\text{m}^3$$

$$a) Q = (5)(1) = 5.00 \text{ C}$$

$$e = \frac{Q}{e^-} = \frac{5}{1.6 \times 10^{-19}} = 3.125 \times 10^{19}$$

$$e = 3.12 \times 10^{19}$$

$$b) J = \frac{I}{A} = \frac{5}{\pi \left( \frac{2.05 \times 10^{-3}}{2} \right)^2} = 1514859.6$$

$$J = 1.5 \times 10^6 \text{ A/m}^2$$

$$c) J = nq\vec{v}_d \Rightarrow \vec{v}_d = \frac{J}{nq} = \frac{1.5 \times 10^6}{(8.5 \times 10^{28})(1.6 \times 10^{-19})} = 1.11 \times 10^{-4}$$

$$v_d = 1.11 \times 10^{-4} \text{ mm/s}$$

d) La densidad de corriente y la velocidad cambiarían, el número de electrones por el tiempo sigue igual.



$$d = 1.02 \text{ mm}$$

$$J = 3.20 \times 10^6 \text{ A/m}^2$$

$$n = 8.5 \times 10^{28} \text{ e}^-/\text{m}^3$$

$$a) I = J A$$

$$I = (3.20 \times 10^6) (\pi (\frac{1.02 \times 10^{-3}}{2})^2)$$

$$I = 2.61 \text{ A}$$

$$I = 2.61 \text{ A}$$

$$b) J = n q v_d$$

$$v_d = \frac{J}{nq} = \frac{3.20 \times 10^6}{(8.5 \times 10^{28})(1.6 \times 10^{-19})} = 2.35 \times 10^{-4} \text{ m/s}$$

$$v_d = 2.35 \times 10^{-4} \text{ m/s}$$

$$I = 55 \text{ A} - (0.65 \text{ A/s}^2) t^2$$

$$a) t = 0: - t = 8.0 \text{ s}$$

$$I = \frac{dQ}{dt} \Rightarrow dQ = I dt \quad // \int$$

$$Q = \int I dt = \int_0^8 (55 - 0.65 t^2) dt$$

$$Q = \left[ 55t - \frac{0.65 t^3}{3} \right]_0^8 = \left[ 55(8) - \frac{0.65(8)^3}{3} \right] - 0 =$$

$$Q = 329.06 \text{ C}$$

$$Q = 329 \text{ C}$$

$$b) I = \frac{Q}{t}$$

$$I = \frac{329}{8} = 41.12 \text{ A}$$

$$I = 41.1 \text{ A}$$



$$L = 15.0 \text{ cm}$$

$$d = 1.00 \text{ mm}$$

$$T_0 = 20^\circ\text{C}$$

$$T = 120^\circ\text{C}$$

$$I = 12.5 \text{ A}$$

$$a) \rho = \frac{E}{J}$$

$$E = \rho J$$

$$\rho(T) = \rho_0 [1 + \alpha (T - T_0)]$$

$$E = \rho_{20} [1 + 0.0045 (120 - 20)] \left[ \frac{12.5}{\pi (0.0005)^2} \right]$$

$$J = \frac{I}{A}$$

$$E = (5.25 \times 10^{-8}) [1 + 0.45] (15.91 \times 10^6) =$$

$$E = 1.21 \text{ V/m}$$

$$E = 1.21 \text{ V/m}$$

$$b) R = \frac{\rho L}{A} = \frac{(7.61 \times 10^{-8}) (0.150)}{\pi (0.0005)^2} = 0.0145$$

$$R = 0.0145 \Omega$$

$$c) V = EL = (1.21) (0.15) = 0.182 \text{ V}$$

$$V = 0.182 \text{ V}$$

$$R = 5.60 \text{ } \mu\Omega$$

120 hilos

$$a) R = \frac{5.60 \times 10^{-6}}{120} = 4.67 \times 10^{-8} \Omega$$

$$R_N = 4.67 \times 10^{-8} \Omega$$

$$b) R = (5.60 \times 10^{-6}) (120) = 6.72 \times 10^{-4} \Omega$$

$$R = 6.72 \times 10^{-4} \Omega$$

$$d = 0.84 \text{ mm}$$

$$E = 0.49 \text{ V/m}$$

$$\rho = 2.44 \times 10^{-8} \Omega \cdot \text{m}$$

$$a) I = JA$$

$$I = \frac{E}{\rho} A = \frac{0.49}{2.44 \times 10^{-8}} \left( \pi \left( \frac{0.84 \times 10^{-3}}{2} \right)^2 \right)$$

$$I = 11.13 \text{ A}$$

$$I = 11.1 \text{ A}$$

$$b) x = 6.4 \text{ m}$$

$$V = 3.14 \text{ V}$$

$$c) R = \frac{V}{I} = \frac{3.136}{11.13} =$$

$$V = EL$$

$$V = (0.49) (6.4)$$

$$V = 3.136 \text{ V}$$

$$R = 0.2817 \Omega$$

$$R = 0.28 \Omega$$