UNIVERSIDAD DE SAN CARLOS DE GUATEMALA
FACULTAD DE INGENIERÍA
ESCUELA DE CIENCIAS
DEPARTAMENTO DE FÍSICA
ING. OSCAR TECUN

Física 2 P	Nota:
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AUX. ANDREA GARCIA	

TAREA ☐
HOJA DE TRABAJO ■
EXAMEN CORTO ☐

No. 7

CARNÉ:	201709088	FECHA:	23/06/2022
NOMBRE:	Leonel Antonio González García		

HT7.

Problema 1:

Oro: $L_1 = 20\,cm$, $A_1 = 1\,cm^2$, $\rho_{Au} = 2.5\times10^{-8}\,\Omega m$

Plata: $L_2 = 30\,cm$, $A_2 = 1.5\,cm^2$, $\rho_{Ag} = 1.5\times10^{-8}\,\Omega m$

$E = 50\,\frac{V}{m}$

a) $J = E/\rho$

$$J = \frac{50\times10^{-4}}{2.5\times10^{-8}} = 2000\ A/m^2$$

$J = 2\,kA/m^2$

b) $I = JA$

$I = (2000)(1\times10^{-4}) = 0.2A$

$I = 0.2A$

c) $E_{Ag} = J_{Ag}\rho_{Ag}$

$$E_{Ag} = \frac{I_{Ag}\rho_{Ag}}{A_{Ag}} = \frac{(0.2)(1.5\times10^{-8})}{1.5\times10^{-4}} = 2\times10^{-5}\ V/m$$

$E_{Ag} = 2\times10^{-5}\ V/m$

d) $V_d = \frac{I}{nAq}$

$$6.022\times10^{23}\frac{ato.}{mol}\times\frac{1\,mol}{107.878\,g}\times\frac{10.5\,g}{1\,cm^3}\times\frac{(100\,cm)^3}{1\,m^3}\times\frac{1\,e^-}{1\,ato.} =$$

$$= 5.8594\times10^{28}\ e/m^3$$

$$V = \frac{0.2}{(5.8594\times10^{28})(1.5\times10^{-4})(1.6\times10^{-19})} = 1.42\times10^{-7}\ m/s$$

$V = 1.42\times10^{-7}\ m/s$

e) $\Delta V = E_{Au}I_{Au} + E_{Ag}I_{Ag} = (50\times10^{-6})(0.2) + (2\times10^{-5})(0.3) = 16\times10^{-6}$ Volts

$\Delta V = 16\times10^{-6}$ volts.

Problema 2:

$V = 120\,v$

$R = 100\times10^{-8}\,\Omega m$

$\alpha = 0.004\,°C^{-1}$

$P = 2400$ watt.

a) $P = \Delta V I$

$$I = \frac{2400}{120} = 20A.$$

$I = 20\,A$

b) $R = \frac{V}{I} = \frac{120}{20} = 6\,\Omega$

$R = 6\,\Omega$

c) $R = R_0(1+\alpha(T-T_0))$

$R = 6(1+0.004(100-20)) = 6.192\,\Omega$

$R = 6.19\,\Omega$

Problema 3:

P = 7.5 W

V = 175 V

$\alpha = 4.5 \times 10^{-3}$

$I = \frac{7.5}{175} = 0.06\ A$

$R_{eq} = \frac{175}{0.06} = 2083.3\ \Omega$

$R_{eq} = \frac{2083.33}{(4.5 \times 10^{-3})(140-20)} = 1352\ \Omega$

$R = 1352\ \Omega$

Problema 4:

$R = \frac{\rho l}{\pi r^2}$

$m_1 = m_2$

$\rho V_1 = \rho V_2$

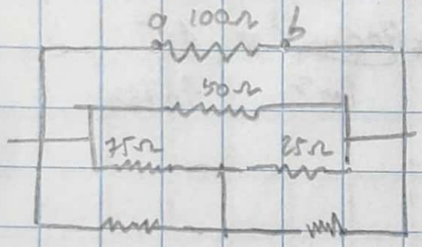
$\pi r^2 l = A_2 \frac{l}{4}$

$A_2 = 4\pi r^2$

$\Rightarrow R_2 = \frac{\rho l/4}{4\pi r^2} = \frac{\rho l}{16\pi r^2} = \frac{R}{16}$

$R/16$

Problema 5:



$R_{eq1} = \left(\frac{1}{100} + \frac{1}{50}\right)^{-1} = \frac{100}{3}\ \Omega$

$R_{eq2} = \left(\frac{1}{75} + \frac{1}{40}\right)^{-1} = \frac{600}{23}\ \Omega$

$R_{eq3} = \left(\frac{1}{25} + \frac{1}{50}\right)^{-1} = \frac{50}{3}\ \Omega$

$R_{eq4} = R_{eq2} + R_{eq3}$

$R_{eq4} = \frac{2950}{69}\ \Omega$

$\Rightarrow R_{eq} = \left(\frac{1}{\frac{100}{3}} + \frac{1}{\frac{2950}{69}}\right)^{-1} = 18.73\ \Omega$

$R_{eq} = 18.73\ \Omega$