Ej 38

l (m)	ΔV (V)	I (A)	R (Ω)	ρ (Ω·m)
0,540	5,22	0,500	10,44	$1,41 \cdot 10^{-6}$
1,028	5,82	0,276	21,08	$1,5 \cdot 10^{-6}$
1,543	5,94	0,187	31,78	$1,5 \cdot 10^{-6}$

a)

$R = \frac{\Delta V}{I}$ $\quad \frac{5,22}{0,500} = 10,44$ / $\frac{5,82}{0,276} = 21,08$ / $\frac{5,94}{0,187} = 31,78$

$\rho = \frac{A \cdot R}{l}$ $\quad \frac{7,3 \cdot 10^{-8} m^2 (21,1 \Omega)}{1,028} = 1,5 \cdot 10^{-6}$

$\frac{7,3 \cdot 10^{-8} m^2 (10,4 \Omega)}{0,54} = 1,41 \cdot 10^{-6}$

$\frac{7,3 \cdot 10^{-8} m^2 (31,8 \Omega)}{1,543} \simeq 1,5 \cdot 10^{-6}$

b

Valor Promedio $\simeq \frac{(1,41 + 1,5 + 1,5) \cdot 10^{-6}}{3}$

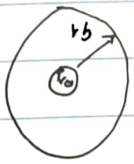
$\simeq 1,47 \cdot 10^{-6}\ \Omega m$

c)

Coeficiente de resistencia Nichrome $\simeq 150 \cdot 10^{-8} \simeq$ Valor promedio

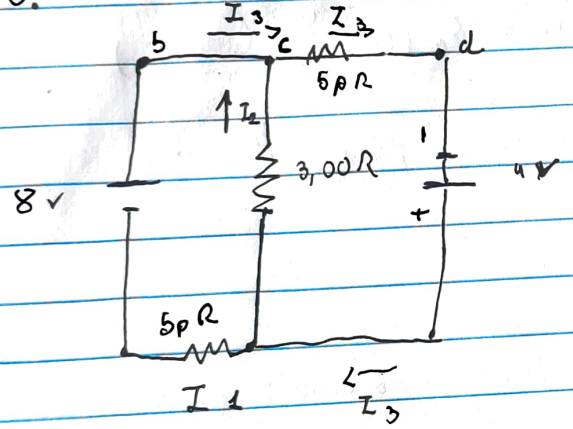
49.

$$R = \rho \frac{r}{A} = \rho \frac{r_a - r_b}{4\pi (r_a - r_b)^2}$$



$$= \frac{\rho}{4\pi} \left(\frac{1}{r_a - r_b} \right.$$

35.



$$C: \quad I_1 + I_2 - I_3 = 0$$

$$-5I_3 + 4 - 3I_2 = 6$$

$$-5I_1 + 8 + 3I_2 = 0$$

$$\left(\begin{array}{ccc|c} 1 & 1 & -1 & 0 \\ 0 & -3 & -5 & -4 \\ -5 & 3 & 0 & -8 \end{array}\right) \xrightarrow{5f_1 + f_3} \left(\begin{array}{ccc|c} 1 & 1 & -1 & 0 \\ 0 & -3 & -5 & -4 \\ 0 & -8 & -5 & -8 \end{array}\right) \xrightarrow{\frac{3}{8} f_3 + f_2}$$

$$\left(\begin{array}{ccc|c} 1 & 1 & -1 & 0 \\ 0 & -3 & -5 & -4 \\ 0 & 0 & -\frac{55}{8} & -7 \end{array}\right)$$

$$-\frac{55}{8} I_3 = 7 \qquad -3I_2 + \frac{56}{35}(-5) = -4$$

$$I_3 = 1{,}018 \text{ A} \qquad I_2 = \left(4 - \frac{280}{55}\right)\left(\frac{1}{3}\right)$$

$$I_2 = -0{,}36 \text{ A}$$

$$I_1 = 0{,}36 + 1{,}018$$

$$I_1 = 1{,}38 \text{ A}$$

a) $I = 1,018\ A$

b) $I = -0,36\ A$

c) $I = 1,38\ A$

D) $I = 0$

$$C = \frac{Q}{\Delta V} \Rightarrow Q = C \Delta V$$

$$Q = 6 \cdot 10^{-6} \ (3+5)$$

e) $Q = 6,6 \cdot 10^{-5}\ C$

30.

Cuando la corriente fluye por el resistor disipa energía.

$$P_R = I \Delta V_R$$

$$I = \frac{P_R}{\Delta V_R}$$

Calentador

$$I = \frac{P}{\Delta V_R} = \frac{1500\ w}{120\ V} = 12,5\ A$$

tostadora

$$I = \frac{P}{\Delta V_R} = \frac{750\ w}{120\ V} = 6,25\ A$$

$$I_{grill} = \frac{P_{grill}}{\Delta V_R} = \frac{1000\ w}{120\ V} = 8,33\ A$$

b) la corriente administrada es igual a la suma de la corriente en cada dispositivo.

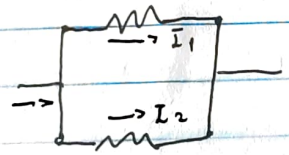
$$I = I_{calentador} + I_{tostadora} + I_{plancha}$$

$$= 12,5\ A + 6,25\ A + 8,33\ A$$

$$= 27,08\ A$$

Para un circuito con 25 A no es suficiente

42.



$$\Delta V_1 = \Delta V_2 \rightarrow R_1 I_1 = R_2 I_2$$

$$I = I_1 + I_2 \qquad I_1 = \frac{R_2 I_2}{R_1}$$

$$I_2 = \frac{R_1 I_1}{R_2}$$

$$I = I_1 + \frac{R_1 I_1}{R_2}$$

$$I_1 = \frac{R_2}{R_2} + \frac{R_1}{R_2}$$

$$I_1 = \frac{I R_2}{R_1 + R_2} \qquad \boxed{I_2 = \frac{I R_1}{R_1 + R_2}}$$

b) $P = I^2 R$

$$= I_1^2 R_1 + I_2^2 R_2$$

$$= I_1^2 R_1 + (I - I_1)^2 R_2$$

$$\frac{dP}{dI_1} = 0 \qquad \frac{dp}{dI_1} = 2 I_1 R_1 + 2(I - I_1)(-1) R_2 = 0$$

$$\boxed{I_1 = \frac{I R_2}{R_1 + R_2}}$$