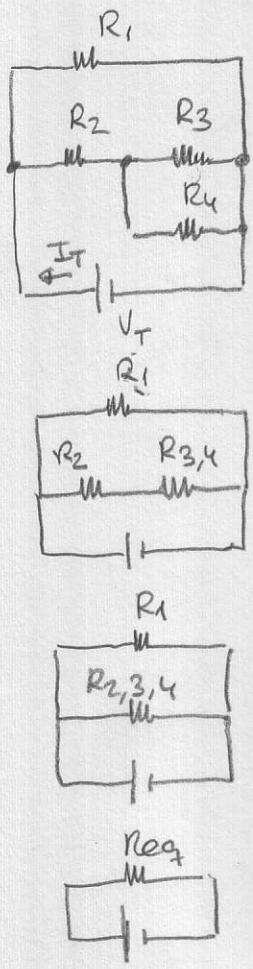
Ejercicio Nº 39 (a).




a) Resist. equivalente:

$$\frac{1}{R_{3,4}} = \frac{1}{R_3} + \frac{1}{R_4} = \frac{1}{30} + \frac{1}{40} = \frac{30+40}{1200} = \frac{70}{1200}$$

$$R_{3,4} = \frac{1200}{70} = 17'14\ \Omega.$$

$$R_{2,3,4} = R_2 + R_{3,4} = 10 + 17'14 = 27'14\ \Omega$$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_{2,3,4}} = \frac{1}{20} + \frac{1}{27'14} = \frac{27'14+20}{542'85} = \frac{47'14}{542'85}$$

$$\frac{1}{R_{eq}} = \frac{47'14}{542'85} \Rightarrow \text{le damos la vuelta}$$

$$R_{eq} = \frac{542'85}{47'14} = 11'51\ \Omega$$

b) $V_T = 100\ V \Rightarrow I_T = \frac{V_T}{R_{eq}} = \frac{100}{11'51} = 8'68\ A$

$$P_T = V_T \cdot I_T = 100 \cdot 8'68 = 868\ W.$$

c) Como $R_1$ y $R_{2,3,4}$ están en paralelo $\Rightarrow V_T = V_{R_1} = V_{2,3,4} = 100\ V$

Luego $\Rightarrow I_1 = \frac{V_1}{R_1} = \frac{100}{20} = 5\ A$

$$I_{2,3,4} = \frac{V_{2,3,4}}{R_{2,3,4}} = \frac{100}{27'14} = 3'68\ A$$

Como $R_2$ y $R_{3,4}$ están en serie $\Rightarrow I_{2,3,4} = I_2 = I_{3,4} = 3'68\ A$

Luego: $V_2 = I_2 \cdot R_2 = 3'68 \cdot 10 = 36'8\ V$

$V_{3,4} = I_{3,4} \cdot R_{3,4} = 3'68 \cdot 17'14 = 63'075\ V$.

Como $R_3$ y $R_4$ están en paralelo $\Rightarrow V_3 = V_4 = V_{3,4} = 63'075\ V$.

Luego $I_3 = \frac{V_3}{R_3} = \frac{63'075}{30} = 2'10\ A$

$$I_4 = \frac{V_4}{R_4} = \frac{63'075}{40} = 1'57\ A.$$

Las potencias:

$P_1 = V_1 \cdot I_1 = 100 \cdot 5 = 500\ W$

$P_2 = V_2 \cdot I_2 = 36'8 \cdot 3'68 = 135'42\ W$.

$P_3 = V_3 \cdot I_3 = 63'075 \cdot 2'10 = 132'45\ W$

$P_4 = V_4 \cdot I_4 = 63'075 \cdot 1'57 = 99'02\ W$