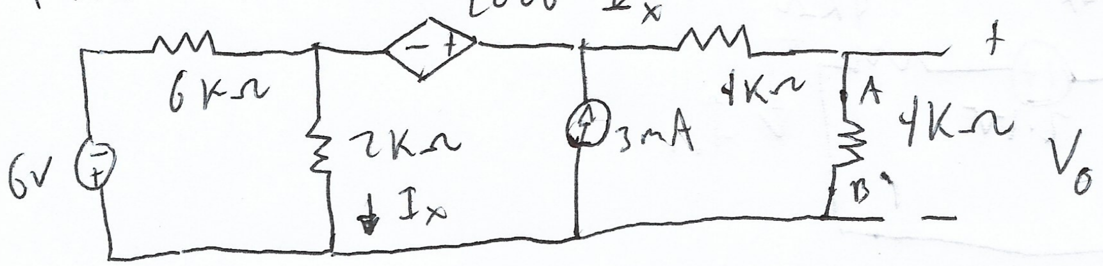
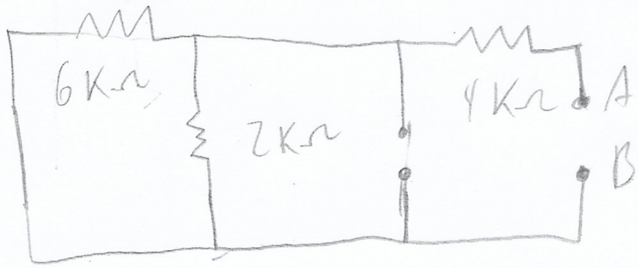
Problema 1




$V_o = R_{4\Omega} I_{4\Omega}$

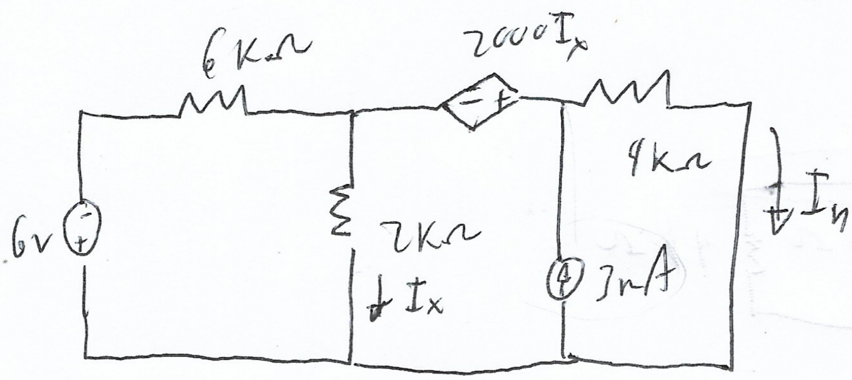
Para la resistencia de Norton



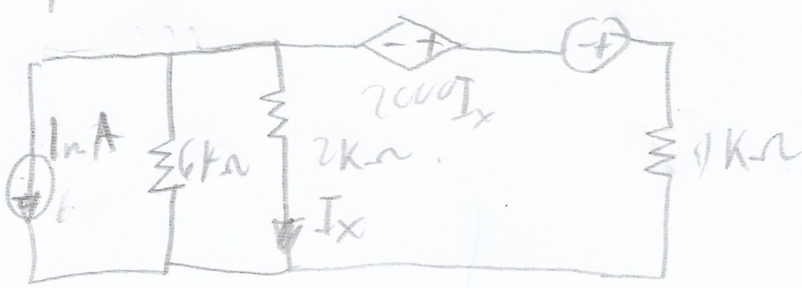

$R_{eq_1} = 1333.3\,\Omega$

$R_{eq_2} = 7333.3\,\Omega$

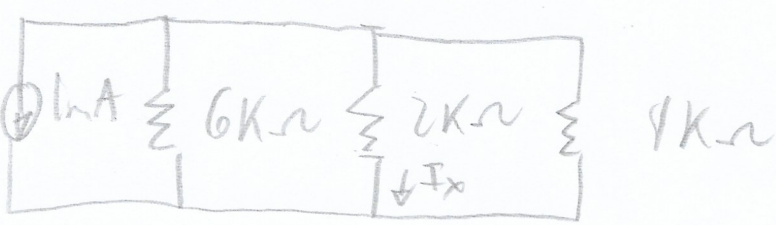
$R_N = R_{eq_2} = 7333.3\,\Omega$




por transformación de fuente

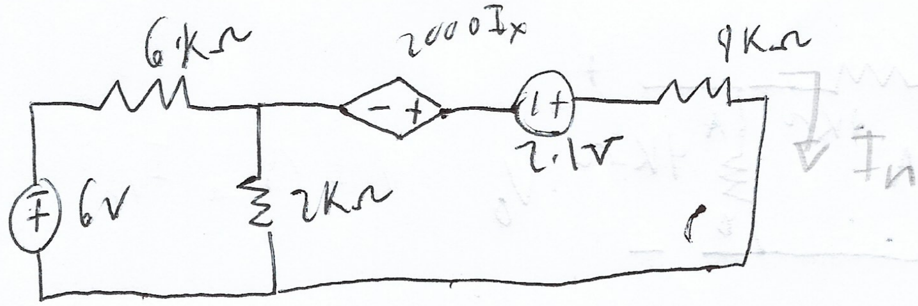



por superposición

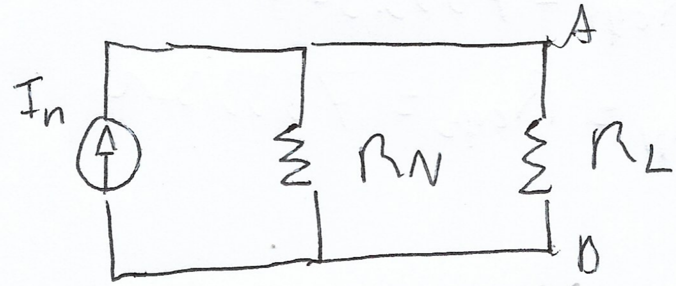


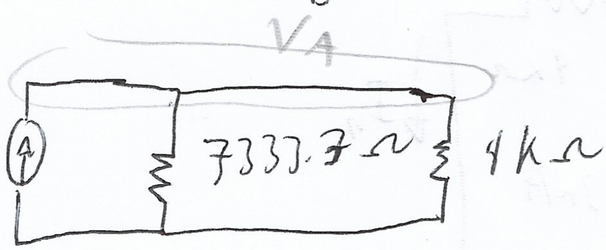

$V_A = 1.09\ V \Rightarrow I_x = \frac{V_A}{R_{2k\Omega}}$

$I_x = 5.454 \times 10^{-4}\ A$




$$I_n = \frac{(2000 I_x + 2.1V)}{4000} = 6.67 \times 10^{-4}$$

⇒ 


⇒ 

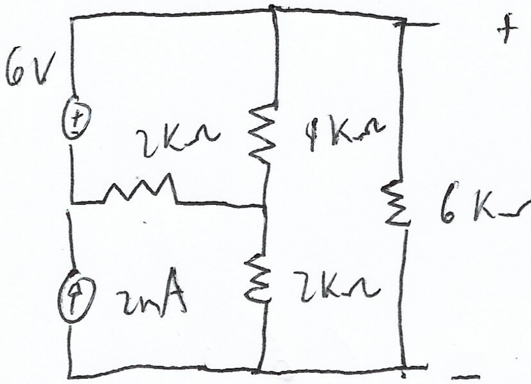

$V_o = R_{4k\Omega} \cdot I_o$

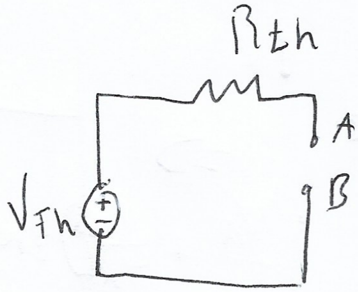
$$V_A = \frac{6.67 \times 10^{-4}}{\left(\frac{1}{7333.3} + \frac{1}{4000}\right)} = 1.72\ V$$

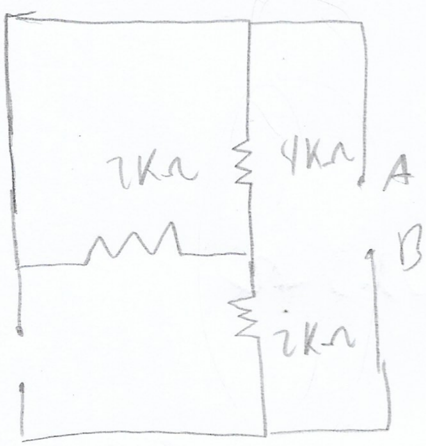
$V_A = V_o$

⇒ $\boxed{V_o = 1.72\ V}$

# Problema 2



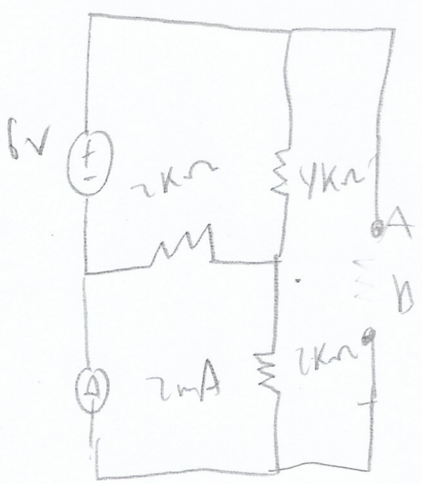



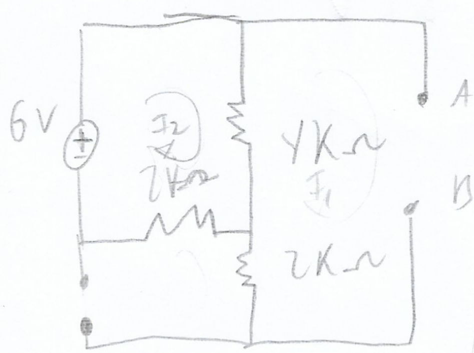

$$R_{eq_1} = \frac{(4k\Omega)(2k\Omega)}{6k\Omega} = 1333.3\,\Omega$$

$$R_{eq_2} = 1333.3k\Omega + 2k\Omega = 3333.3\,\Omega$$

$$R_{th} = R_{eq_2} = 3333.3\,\Omega$$




analizando con superposición




$4K(I_1 - I_2) + 4k\Omega\, I_1 = 0$

$4k\Omega(I_2 - I_1) + 2k\Omega = 6V$

$$\boxed{\begin{aligned} 8k\Omega\, I_1 - 4k\Omega\, I_2 &= 0 \\ -4k\Omega\, I_1 + 6k\Omega\, I_2 &= 6V \end{aligned}}$$

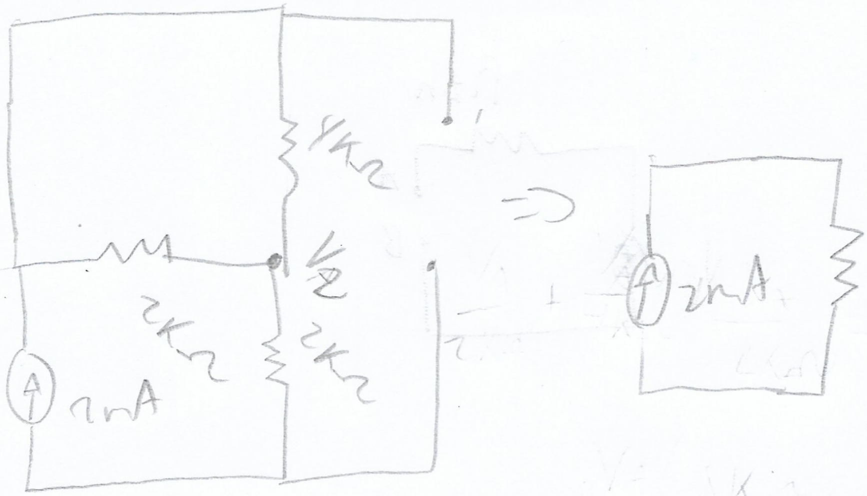
$$\Delta = \begin{vmatrix} 8K & -4K \\ -4K & 6K \end{vmatrix} = 32000000$$

$$\Delta_1 = \begin{vmatrix} 0 & -4K \\ 6 & 6K \end{vmatrix} = 24000 \qquad I_1 = \frac{\Delta_1}{\Delta}$$

encontrando $I_1$

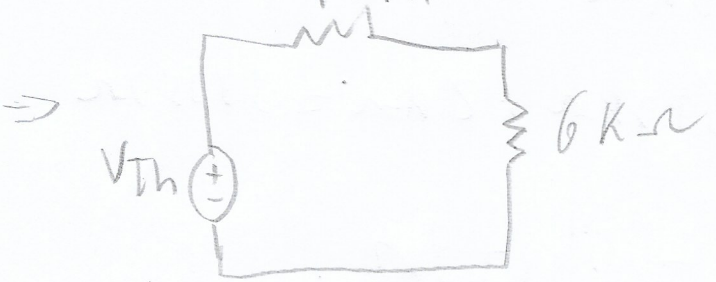
$$I_1 = \frac{3}{4000}$$

$\Rightarrow V_1 = 4\ V$




$V_2 = R \cdot I = 6.6$

$V_{Th} = V_1 + V_2 = 10.6\,V$

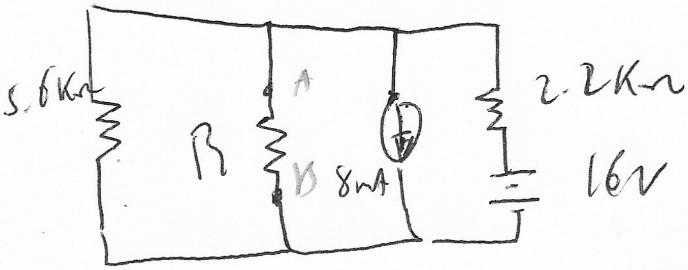


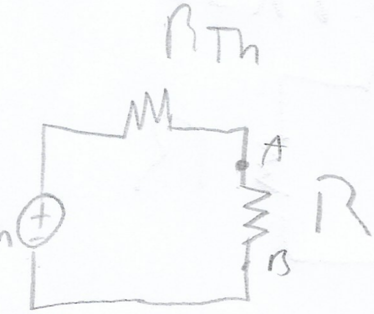

$R_T = 9333.3\,\Omega$

Utilizando divisor de voltaje

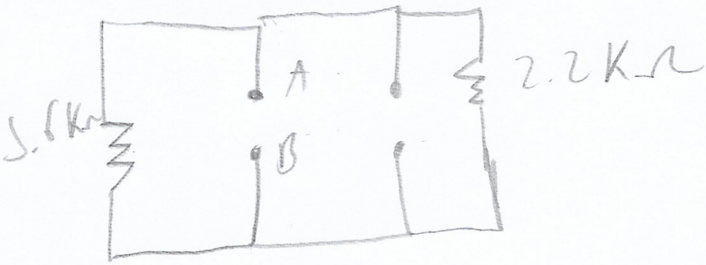
$$\boxed{V_0 = V_{Th} \cdot \frac{6K\Omega}{R_T} = 6.81\,V}$$

Problema 3



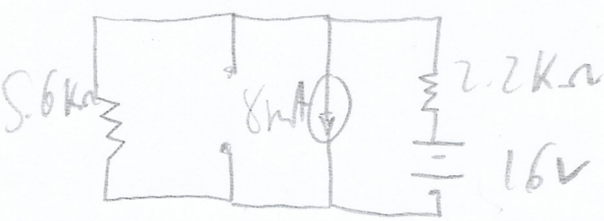

para RTh



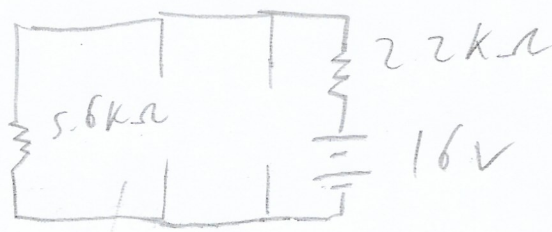

dado que las Resistencias estan en serie

$R_{Th} = 7.8\ k\Omega$

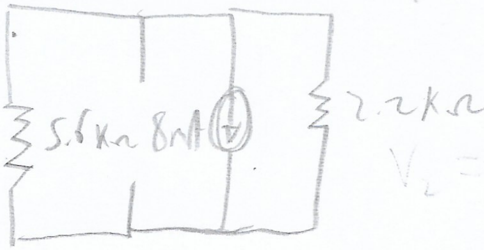
Para VTh



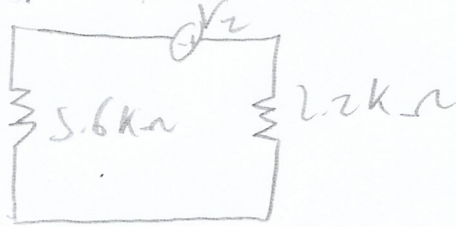

por superposición




$V_1 = 16V$



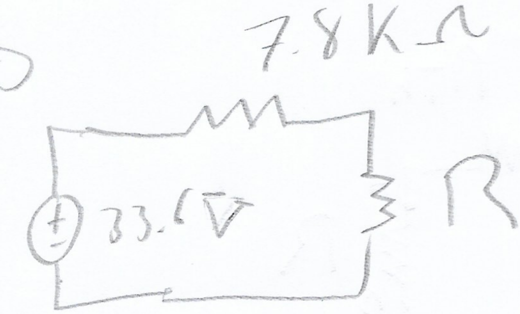

$V_2$ = por transformación de fuente




$V_2 = 17.6\ V$

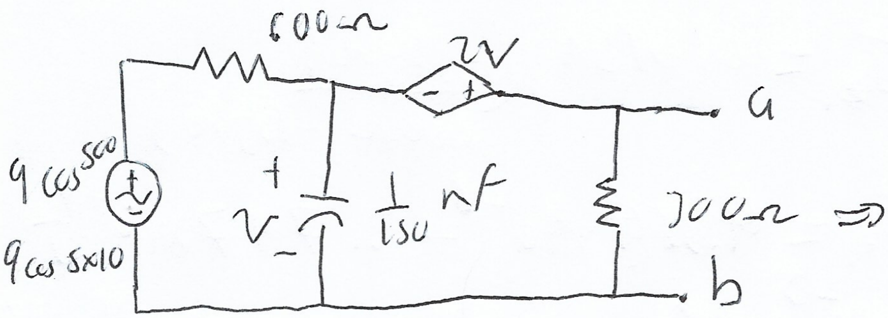
$V_{Th} = V_1 + V_2 = 33.6\ V$

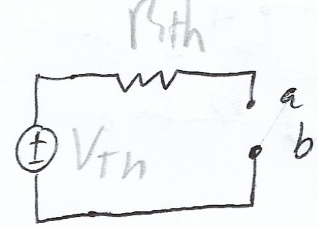
=>



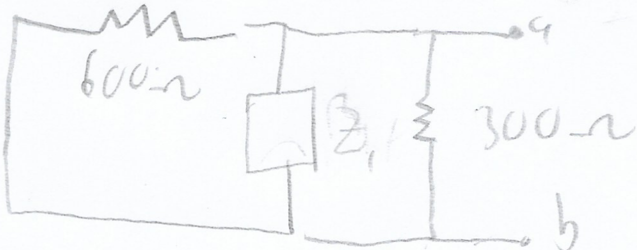
7.8KΩ
33.6V
R

Problema 4




Para $R_{Th}$




$Z_1 = \frac{-1}{10\left(\frac{1}{150}\right)}\, j = -15j\,\Omega$

$Z_{eq_1} = \frac{(300\Omega)(-15j\Omega)}{300\Omega - 15j\Omega} = 0.748 - 14.962j$

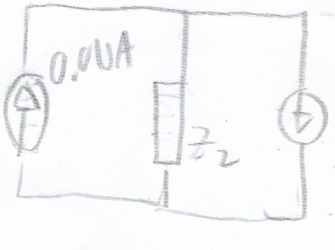
$Z_{eq_2} = 600.748 - 14.962j$

$\boxed{R_{Th} = Z_{eq_2}}$

Para $V_{Th}$

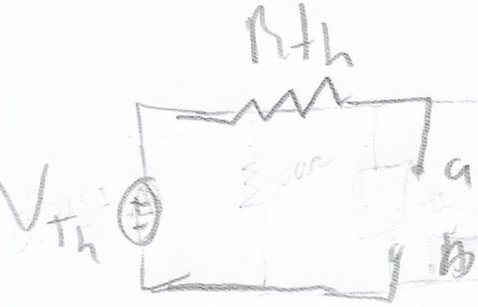

$V = (9V)\frac{(-15j)}{(600-15j)}$

$V = 5.6\times10^{-3} - 0.2j$ V




$V_{Th} = \frac{0.0144 + 1.44\times10^{-3}\,A}{1.118 - 14.160j\,\Omega} = 8.19\times10^{-5} + 1.09\times10^{-}$

$3.74\times10^{-5} - 1.4\times10^{-3}j$ A




$V_{Th} = 8.10 \times 10^{-5} + 1.09 \times 10^{-3} j$ V

$R_{th} = 600.748 - 14.962 j \ \Omega$