(1) fugir das fontes de corrente (dependentes e independentes) (1)

$$\begin{cases} 2\alpha + 3\beta - 3\gamma = 12 \ (I) \\ \text{Sabe-se que:} \begin{cases} \alpha - \beta = 2 \ (II) \longrightarrow \alpha = 2 + \beta \\ \gamma = -4A \ (III) \\ I_0 = \alpha - \gamma \ (IV) \end{cases} \end{cases}$$

II em I e IV em I

$$2.(2+\beta) + 3\beta - 3.(-4) - 12$$

$$4 + 2\beta + 3\beta + 12 = 12$$

$$5\beta = -4 \quad \boxed{\beta = -\frac{4}{5} A}$$

Logo: $\alpha = 2 + \beta$

$$\alpha = 2 - \frac{4}{5} \quad \alpha = \frac{10-4}{5} \quad \boxed{\alpha = \frac{6}{5} A}$$

Desta forma:

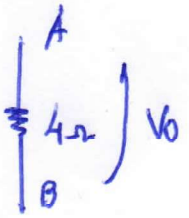
$$I_0 = \alpha - \gamma$$

$$I_0 = \frac{6}{5} - (-4) \quad I_0 = \frac{6+20}{5} = \frac{26}{5} = 5,2A$$

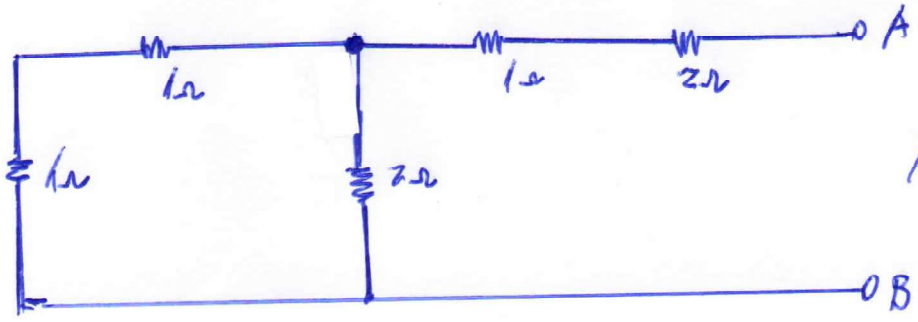
$$\therefore \boxed{I_0 = 5,2A}$$

(2) * Transformar de Fonte para achar E_{th}

Retira-se

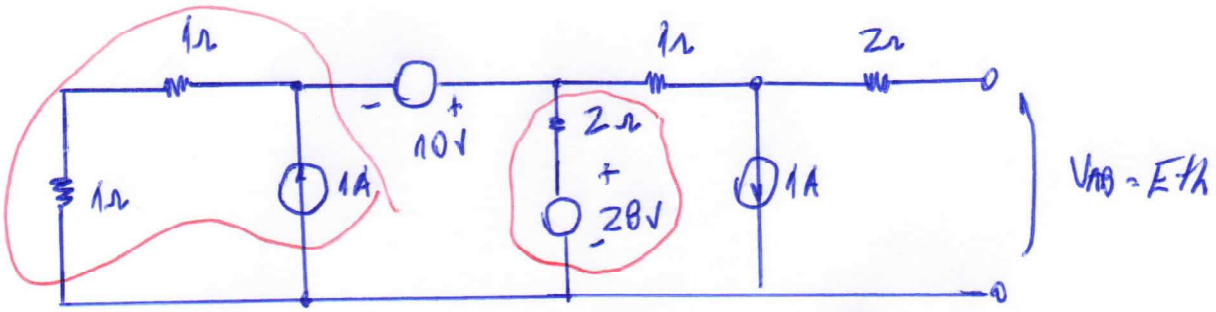


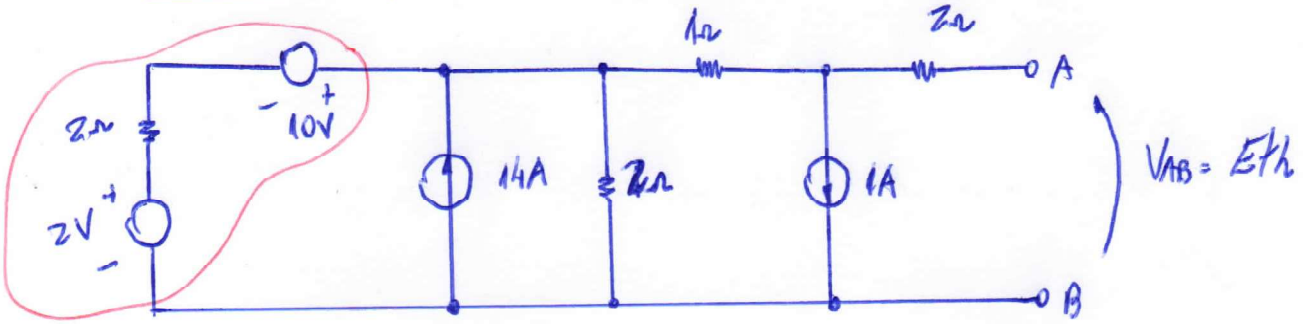
Determinar de R_{th}

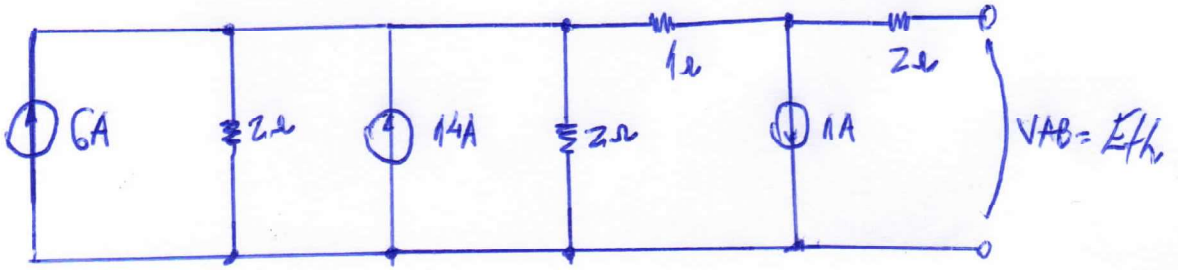


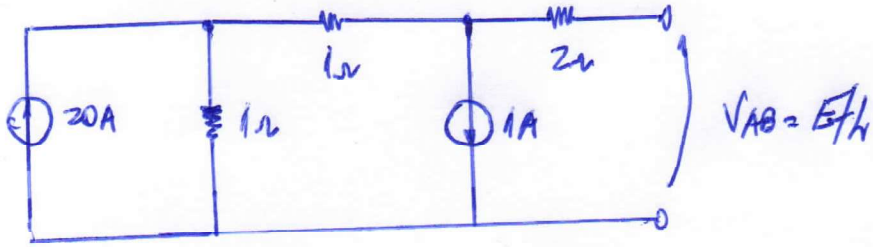
$R_{th} = 4\Omega$

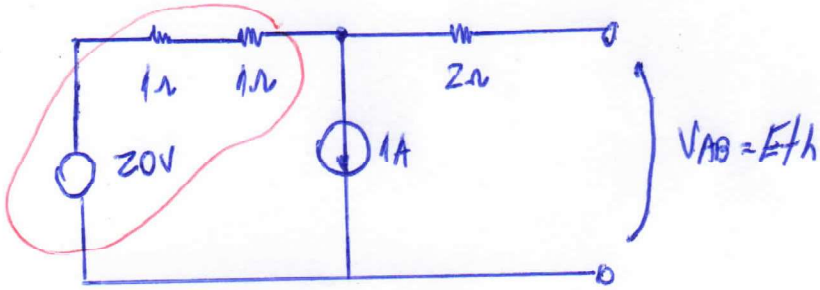
Determinação de Eth:

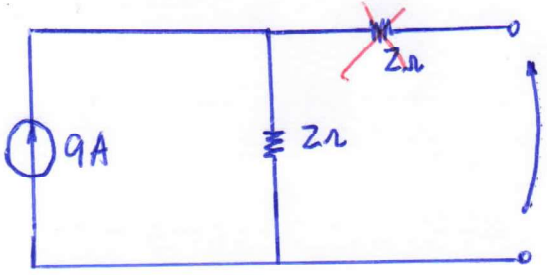










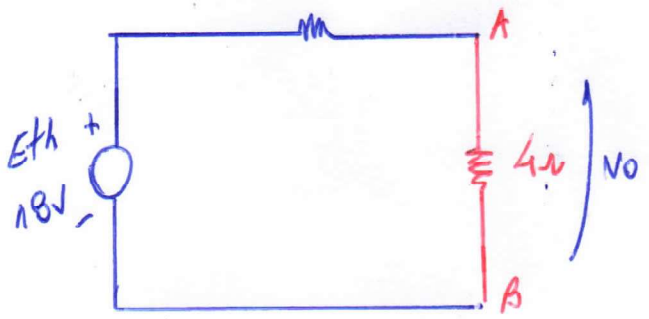


$V_{AB} = E_{th} = 9.2 = 18\,V$

(3)

Desenhar o Circuito Equivalente

$R_{th} = 4\Omega$

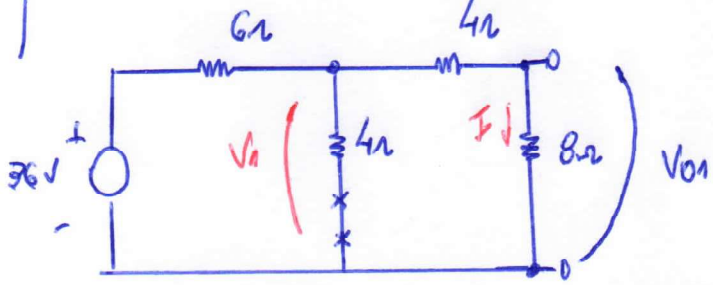


Divisor de tensão

$V_{AB} = V_o = \frac{4}{4+4} \cdot 18 = 9V$

$\boxed{V_o = 9V}$

(3) Influência de 36 V – V_{o1}:



$Req\ I = (8+4) \parallel 4$

$Req\ I = \frac{12 \cdot 4}{12+4} = \frac{48}{16} = 3\Omega$

Divisor de Tensão

$V_1 = \frac{3}{3+6} \cdot 36$

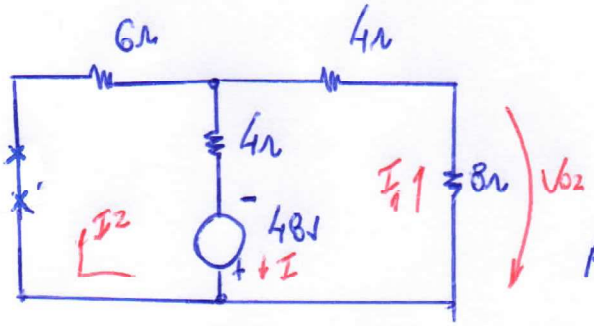
$\boxed{V_1 = 3 \cdot 4 = 12V}$

Logo $V_{o1} = ?$

$V_{o1} = \frac{8}{8+4} \cdot 12$

$\boxed{V_{o1} = 8V}$

Influência de 48V – V_{o2}:



$Req\ I = 12 \parallel 6 + 4$

$Req\ I = 8\Omega$

Itotal = ?

$I = \frac{48}{8} = 6A$

Req I

Divisor de Corrente

$I_1 = \frac{6}{12+6} \cdot I$

$I_1 = \frac{6}{18} \cdot 6 \quad I_1 = 2A$

Logo: $V_{o2} = 8 \cdot I_1$

$V_{o2} = 8 \cdot 2$

$V_{o2} = 16$

Finalmente:

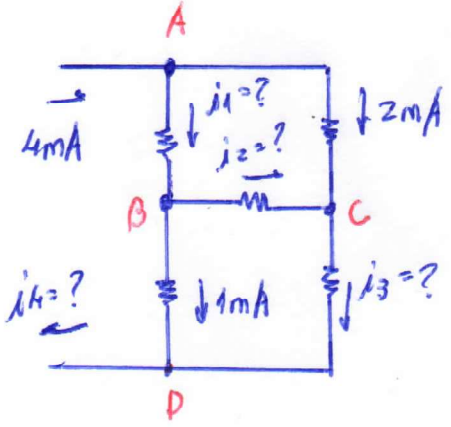
$V_o = V_{o1} + V_{o2}$

$V_o = 8 - 16$

$\boxed{V_o = -8V}$

(C)

(4)



nó A:

$-4 + i_1 + 2 = 0$

$i_1 = 4 - 2$

$\boxed{i_1 = 2mA}$

nó B: $-i_1 + i_2 + 1 = 0$

$-2 + i_2 + 1 = 0$

$i_2 = 2 - 1$

$\boxed{i_2 = 1mA}$

nó C:

$-2 - i_2 + i_3 = 0$

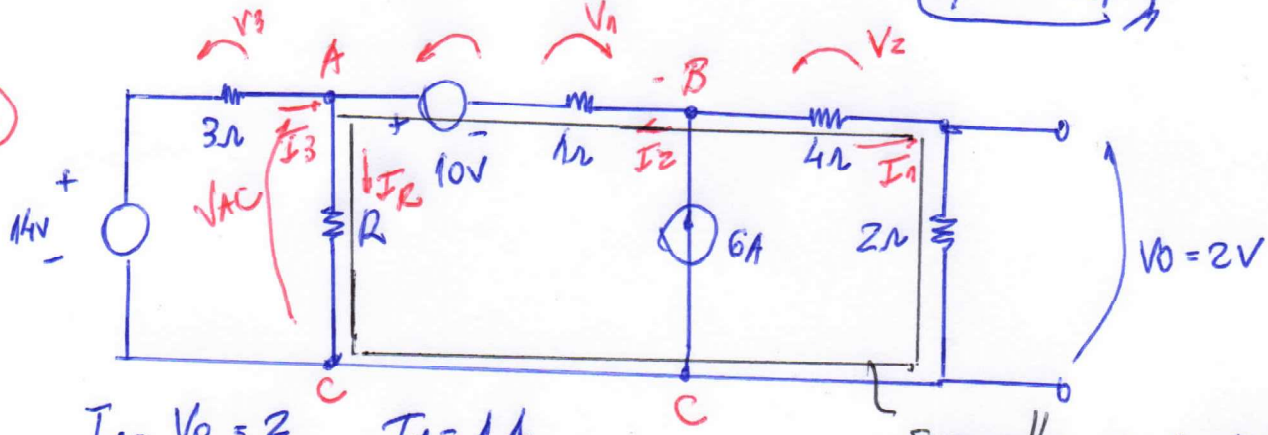
$-2 - 1 + i_3 = 0$ $\quad \boxed{i_3 = 3mA}$

nó D:

$i_4 - 1 - 3 = 0$

$\boxed{i_4 = 4mA}$

(5)



$I_1 = \frac{V_0}{2} = \frac{2}{2}$ $\quad I_1 = 1A$

nó B: $I_2 + I_1 - 6 = 0$

$I_2 = 6 - 1$

$\boxed{I_2 = 5A}$

Supermalha: LKT

$V_{AC} - 10 + V_1 - V_2 - V_0 = 0$

$V_{AC} = 10 - V_1 + V_2 + V_0$

$V_{AC} = 10 - 5.1 + 4.1 + 2$

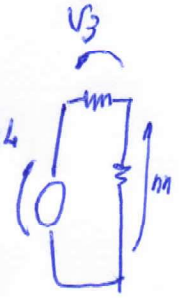
$V_{AC} = 10 - 5 + 6$ $\quad \boxed{V_{AC} = 11V}$

Supermalha: $14 - V_3 - 11 = 0$

$11 = 14 - V_3$

$-V_3 = 11 - 14$

$\boxed{V_3 = 3V}$



nó A:

$-I_3 + I_R - I_2 = 0$

$I_R = I_2 + I_3$

$I_R = 5 + \frac{V_3}{3}$

$I_R = 5 + \frac{3}{3}$ $\quad \boxed{I_R = 6A}$

Logo: $V_{AC} = R \cdot I_R$

$R = \frac{V_{AC}}{I_R} = \frac{11}{6}$

$\boxed{R = 1,83\Omega}$