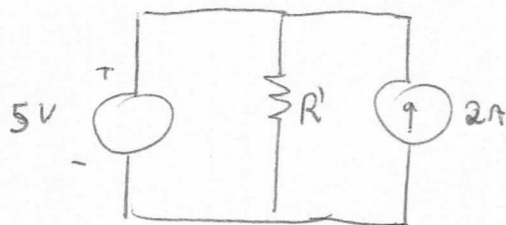


1)

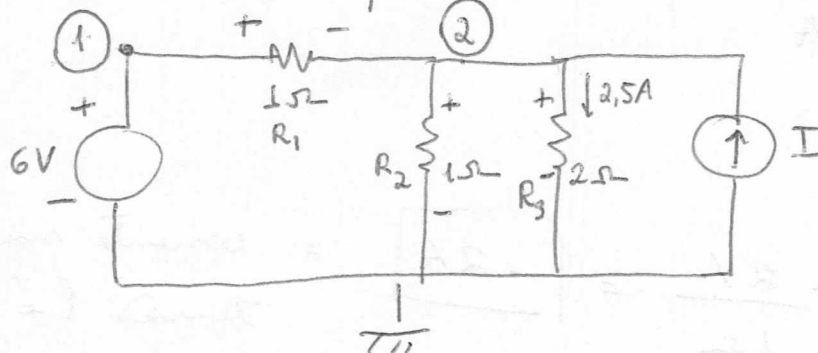


Pois que a corrente na fonte de tensão seja nula, basta que a corrente em R' seja 2A.

$$\left. \begin{array}{l} V_{R'} = 5V \\ I_{R'} = 2A \end{array} \right\} \Rightarrow R' = \frac{5}{2} \text{ . Mas } \frac{1}{R'} = \frac{1}{10} + \frac{1}{R}$$

$$\Rightarrow \frac{2}{5} - \frac{1}{10} = \frac{1}{R} \Rightarrow \boxed{R = \frac{10}{3} \Omega}$$

2) Considerando a fonte de tensão de 6V;



No resistor R_3 :

$$U_2 = 2\Omega \times 2,5A = 5V$$

No resistor R_2 :

$$i_{R2} = \frac{5V}{15\Omega} = \frac{1}{3}A$$

No resistor R_1 :

$$U_{R1} = e_1 - e_2 = 1V$$

$$\Rightarrow I_{R1} = \frac{1V}{1\Omega} = 1A$$

No nó 2:

$$1A + I = 5A + 2,5A \Rightarrow I = 6,5A$$

Portanto:

- a) Corrente na fonte de tensão $\boxed{1A}$ (é geradora)
- b) Corrente na fonte de corrente: $\boxed{I = 6,5A}$
- c) Para o circuito com fonte de tensão $3V$ temos:

$$\left. \begin{array}{l} e_2 = 5V \\ i_{R2} = 5A \end{array} \right\} \text{(idênticos ao caso anterior)}$$

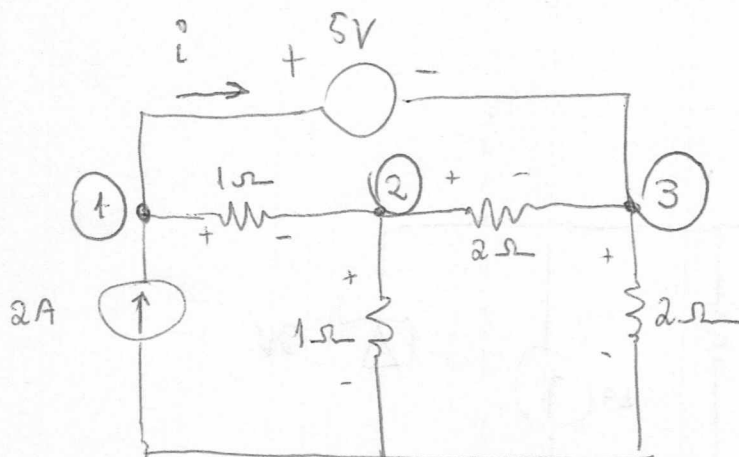
Porém

$$i_{R1} = -\frac{2V}{1\Omega} = \boxed{-2A} = \text{corrente na fonte de tensão (é receptora)}$$

No nó 2:

$$I - 2A = 7,5A \Rightarrow \boxed{I = 9,5A} \text{ / corrente na fonte de corrente)}$$

3)



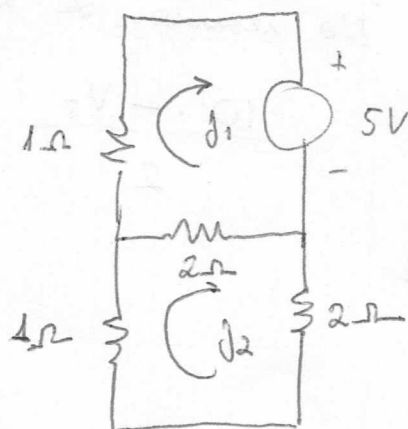
1	-1	0	1
-1	$\frac{5}{2}$	$-\frac{1}{2}$	0
0	$-\frac{1}{2}$	1	-1
1	0	-1	0

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ i \end{bmatrix}$$

=

$$\begin{bmatrix} 2 \\ 0 \\ 0 \\ 5 \end{bmatrix}$$

4)

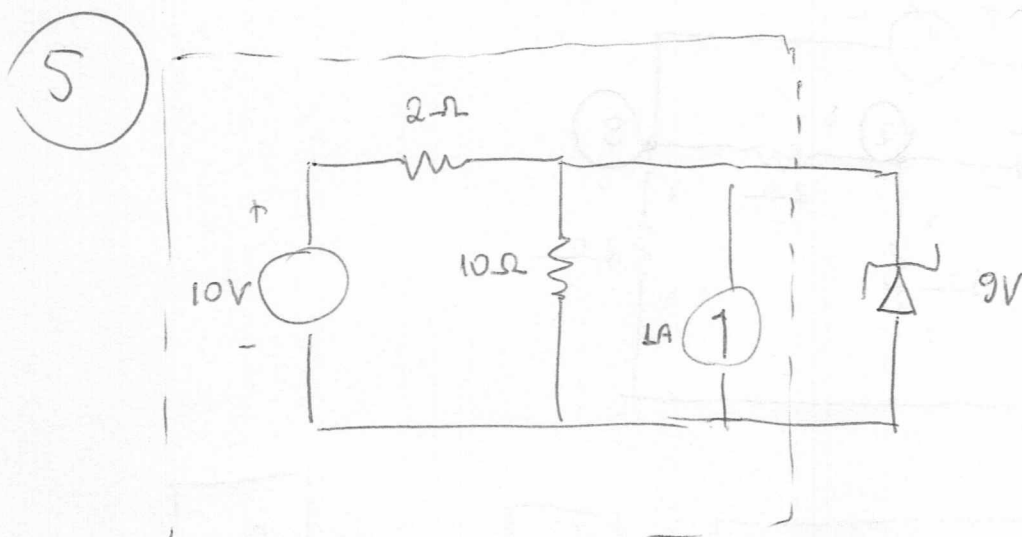


3	-2
-2	5

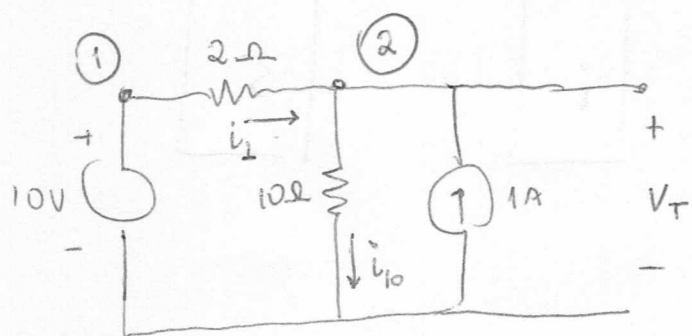
$$\begin{bmatrix} d_1 \\ d_2 \end{bmatrix}$$

=

$$\begin{bmatrix} -5 \\ 0 \end{bmatrix}$$



Para obter o equivalente de Thévenin do circuito dentro da linha tracejada:



No resistor de 10Ω :

$$V_T \equiv 10\Omega \cdot i_{10} \quad \text{eq do nº 2}$$

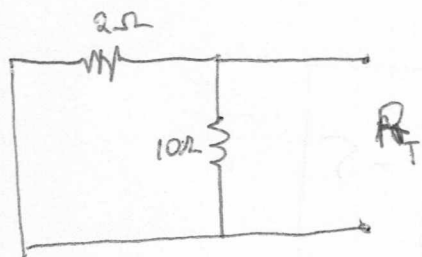
$$= 10\Omega (i_1 + 1A)$$

No resistor de 2Ω :

$$\frac{10 - V_T}{2} = i_1$$

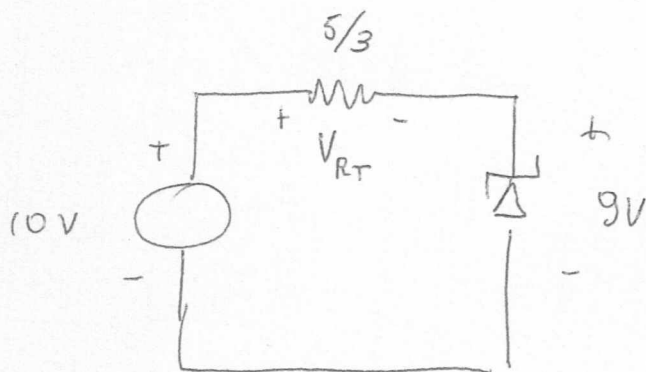
Portanto:

$$\begin{cases} 10(i_1 + 1) = V_T \\ 10 - V_T = 2i_1 \end{cases} \Rightarrow \begin{cases} V_T = 10V \\ i_1 = 0 \end{cases}$$



$$\Rightarrow R_T = \frac{2 \times 10}{2 + 10} = \boxed{\frac{5}{3} \Omega}$$

Portanto o circuito equivalente é:



Observe-se que o diodo zener está polarizado reversamente, portanto sua tensão é 9V.

A corrente é dada por

$$\frac{V_{RT}}{R_T} = \frac{10 - 9}{\frac{5}{3}} = \frac{3}{5}$$

Portanto, no diodo:

$$i = 0,6 \text{ A}$$