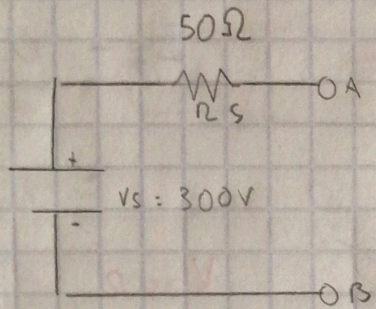
Capitulo 8 - Ejercicios con respuesta / impares

Conversión de Fuente

1. Una Fuente de voltaje tiene los valores $V_s = 300\ V$ y $R_s = 50\ \Omega$ Conviertala a una fuente de corriente equivalente



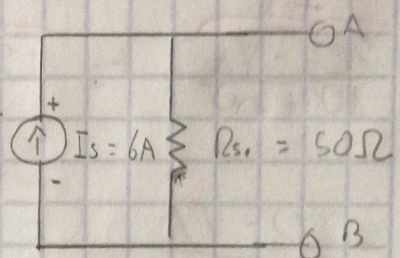
$$I_s = \frac{V}{R}$$

$$I_s = \frac{300\ V}{50\ \Omega}$$

$$I_s = 6\ A$$

$$R_s = R_{s1}$$

$$R_{s1} = 50\ \Omega$$



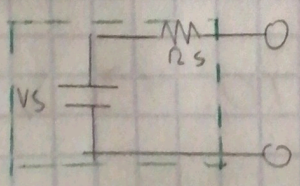
$V_s = 300\ V$

$R_s = 50\ \Omega$

3. Una bateria tipo D nuevo tiene entre sus terminales un voltaje de 1,6 V y puede suministrar hasta 8.0 A a un corticircuito durante muy poco tiempo ¿ Cual es la resistencia interna de la bateria?

Datos $V_s = 1,6\ V$

$I_s = 8.0\ A$



Resolucion

$$V_s = I_s \cdot R_s$$

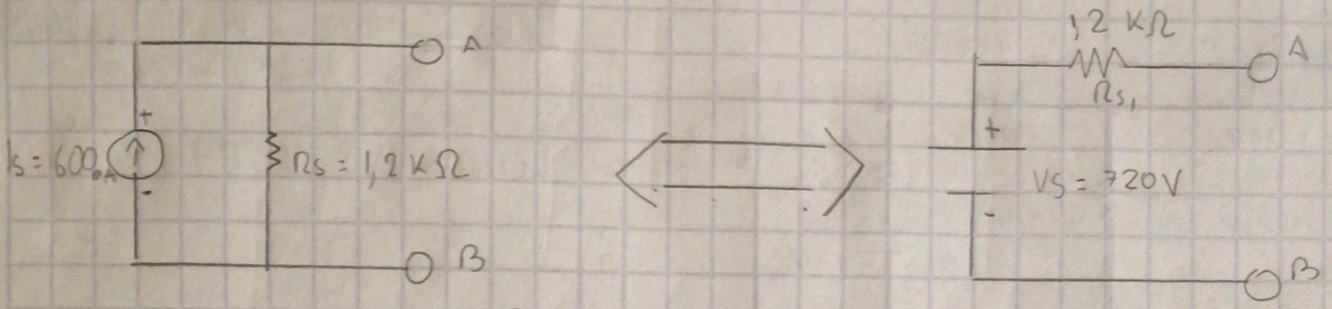
$$R_s = \frac{V_s}{I_s}$$

$$R_s = \frac{1,6}{8,0}$$

$$R_s = 0,2\ \Omega$$

$$R_s = 200\ m\Omega$$ //

5. Una Fuente de corriente tiene I_s de 600mA y una R_s de 1,2 KΩ. Convierte en una Fuente de voltaje equivalente



$I_s = \frac{V_s}{R_s}$ $\quad I_s = 600mA$ $\quad R_s = R_{s1}$

$R_s = 1,2K\Omega$ $\quad R_{s1} = 1,2K\Omega$

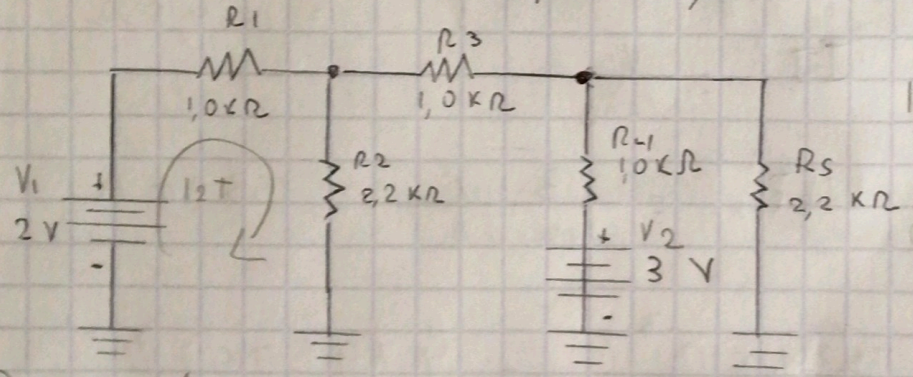
$V_s = I_s \cdot R_s$

$V_s = 600 \times 10^{-3} \cdot 1,2 \cdot 10^{3}$

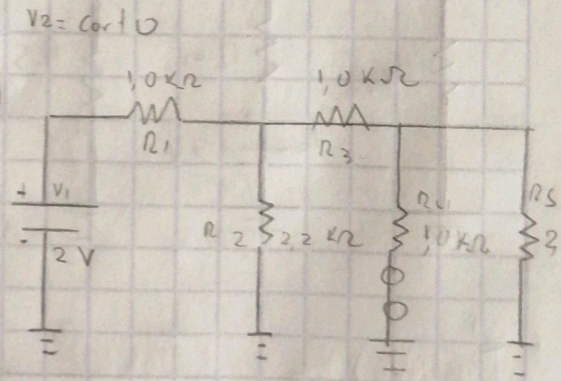
$V_s = 720\ V$ //

Teorema de Superposición

7. Con el metodo de superposicion, encuentre la corriente a traves de R_5



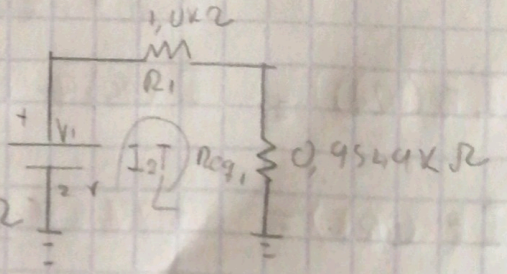
1)



$R_{4S} = \frac{1}{1/1,0 \quad 1/2,2} = 0,6875\ K\Omega$

$R_3 + R_{4S} = 0,6875 + 1,0 = 1,6875\ K\Omega$

$R_{eq_1} = R_2 \,||\, R_3 + R_{4S} = \frac{1}{1/1,6875 + 1/2,2} = 0,9549\ K\Omega$



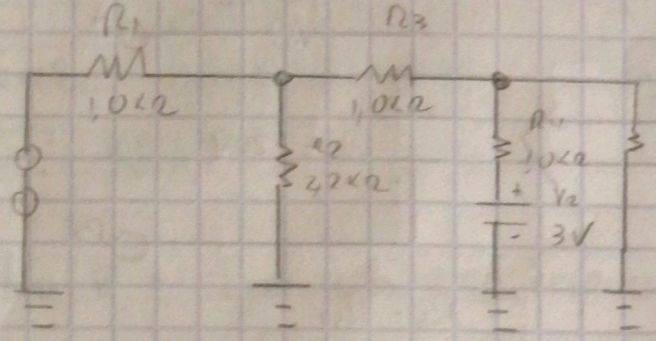
$R_{T_1} = R_1 + R_{eq_1} = 0,9549\ K\Omega + 1,0K\Omega$

$R_{T1} = 1,954\ K\Omega \approx 1954\ \Omega$ //

$$I_{T_1} = \frac{V_0}{R_{T_1}} = \frac{2\ V}{1954\ \Omega} = 1{,}023 \times 10^{-3}\ A$$

$$= 1{,}023\ mA$$

2)



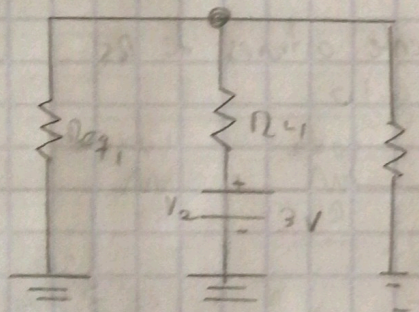
$$I_{(R5)} = \frac{1{,}0 \times 10^{3} \cdot 1{,}023 \times 10^{-3}}{1{,}0 \times 10^{3} + 2{,}2 \times 10^{3}}$$

$$I_{(R5)} = 3{,}196875 \times 10^{-4}$$

$$R_1 \parallel R_2 = \frac{1}{1/1{,}0 + 1/2{,}2} = 0{,}6875\ k\Omega$$

$$Req_1 = R_1 \parallel R_2 + R_3 = 0{,}6875 + 1{,}0 = 1{,}6875\ k\Omega$$

$$Req_2 = Req_1 \parallel R_5 = \frac{1}{1/1{,}6875 + 1/2{,}2} = 0{,}9549\ k\Omega$$



$$RT_2 = 0{,}9549 + 1{,}0 = 1{,}9549\ k\Omega$$

$$= 1954{,}9\ \Omega$$

$$I_T = \frac{V_2}{RT_2}$$

$$I_T' = \frac{3\ V}{1954{,}9\ \Omega} = 1{,}534\ mA$$

$$I'_{(R5)} = \frac{1{,}0 \times 10^{3} \cdot 1{,}534 \times 10^{-3}}{1{,}0 \times 10^{3} + 2{,}2 \times 10^{3}} = 4{,}79375 \times 10^{-4}$$

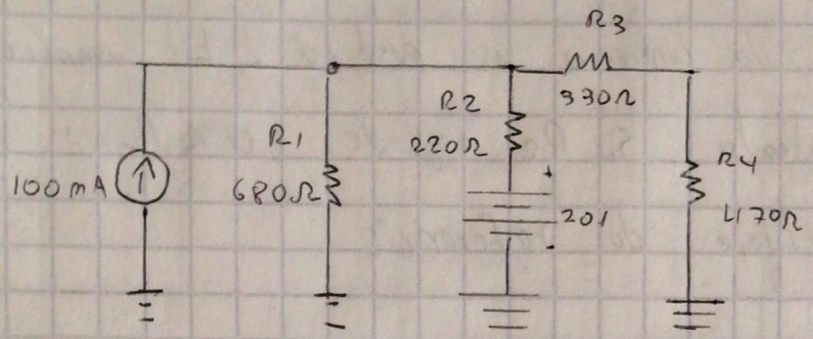
$$I_{T(R5)} = I_{(R5)} + I'_{(R5)}$$

$$I_{T(R5)} = 3{,}196875 \times 10^{-4} + 4{,}79375 \times 10^{-4}$$

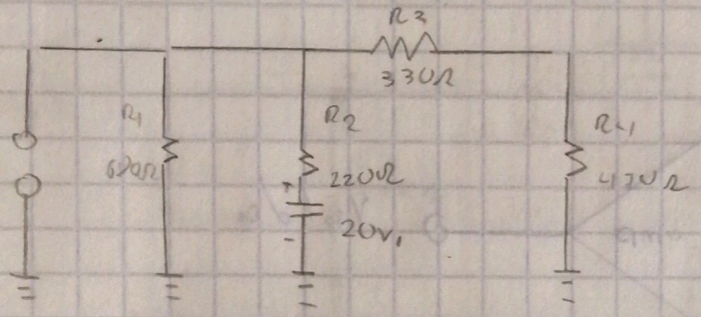
$$I_{T(R5)} = 8{,}1506 \times 10^{-4}\ A$$

$$I_{T(R5)} = 845{,}0 \times 10^{-6}\ A = 845\ \mu A$$ //

9. Con el teorema de superposición, determine la corriente a traves de R_3



1)



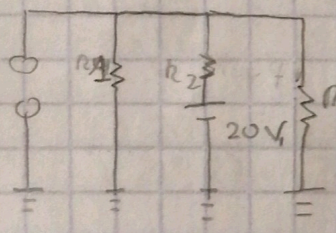
$Req_1 = R_3 + R_4$

$Req_1 = 330 + 470$

$Req_1 = 800\,\Omega$

$Req_2 = Req_1 \,||\, R_1 = \dfrac{1}{1/800 + 1/680}$

$Req_2 = 367,56\,\Omega$



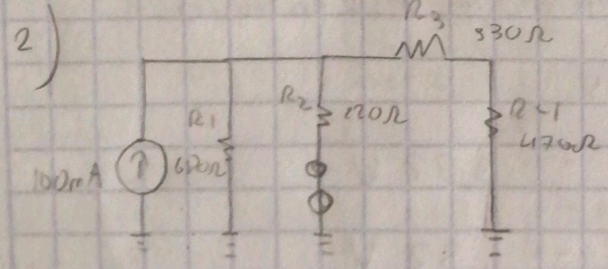
$Req_2 + R_2 = 367,56 + 220$

$R_{T1} = 587,56\,\Omega$

$I_T' = \dfrac{V_1}{R_{T1}} = \dfrac{20}{587,56} = 0,0340\,A$

$I(R_3) = \left(\dfrac{220}{220+330}\right) 0,0340 = 0,0136A$

2)



$Req_1 = 800\,\Omega$

$Req_2 = Req_1 \,||\, R_1$

$Req_2 = 367,56\,\Omega$

$Req_2 + R_2 = 367,56 + 220$

$I_T' = 100\,mA$

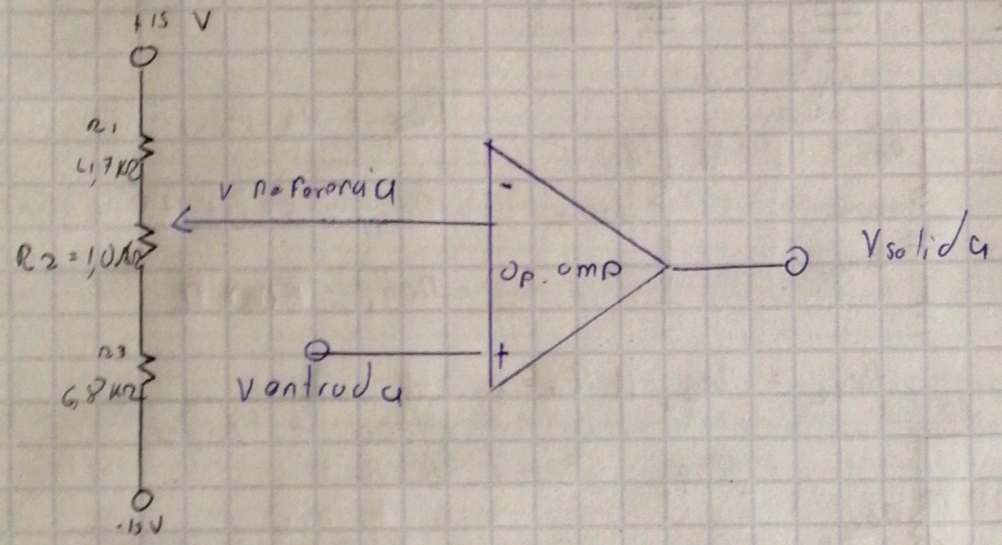
$I'(R_3) = \left(\dfrac{220}{220+330}\right) 100 \times 10^{-3}$

$I'(R_3) = 0,04$

$R_T = Req_2 + R_2 = 587,56\,\Omega$

$I_T(R_3) = I(R_3) + I'(R_3) = 1,6\,mA$

11.- El voltaje de entrada Ventrada, se compara con el voltaje de referencia, VReferencia y se genera una salida negativa si VReferencia > Ventrada de lo contrario es positivo. El comparador no carga una o otra entrada. Si R2 es de 1,0 KΩ ¿Cuál es el intervalo de voltaje de referencia



Si => R2 = 1,0 KΩ -> NO Carga

Divisor de Voltaje

RT = 12,5 KΩ

VT = 15 V

$V_{R_1} = V_T \frac{R_1}{R_T}$

$V_{R_1} = 15 \cdot \frac{4,7}{12,5}$

VR1 = 5,87 V

$V_{R2} = 15 \cdot \frac{1,0}{12,5}$

VR2 = 1,2 V

$V_{R3} = 15 \cdot \frac{6,8}{12,5} = 8,16$ V

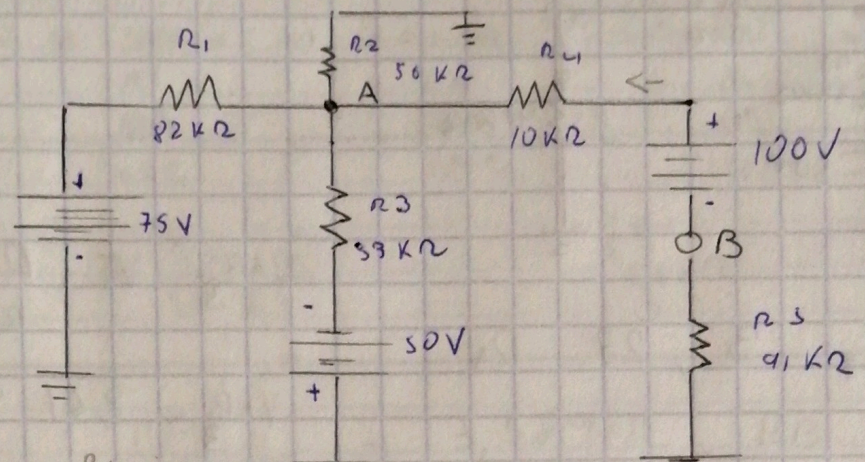
Si: V referencia > V entrada

Entonces

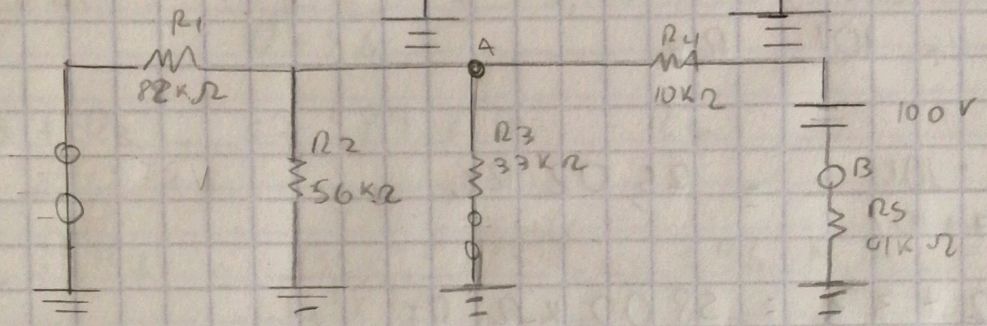
Vmax = 3,72 V

Vmin = 1,32 V

B:- Determine el voltaje del pto A al punto B



1)



$R_1 \parallel R_2 = \frac{56 \cdot 82}{82+56} = 33,27\ \Omega A$

$\Omega A \parallel R_3 = \frac{33,27 \cdot 33}{33,27+33} = 16,56\ \Omega B$

$R_B + R_4 = 16,56 + 10 = 26,56\ \Omega C$

$\Omega C + \Omega S = 26,56 + 91 = 117,56 K\Omega RT.$

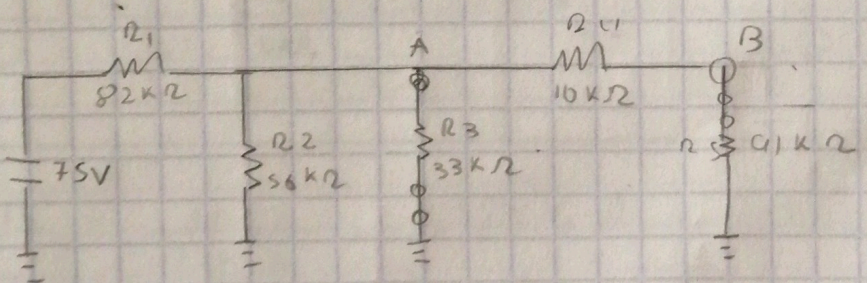
$V_{AB} = V_{R4}$

$V_{AB} = V_T \cdot \frac{R_4}{R_T}$

$V_{AB} = \frac{100 \cdot 10}{117,56}$

$V_{AB} = 8,50\ V$

2)



$R_4 + R_5 = 10 + 91 = 101\ \Omega A$

$R_A \parallel R_3 = \frac{101 \cdot 33}{33+101} = 24,87\ \Omega B$

$R_2 \parallel R_B = \frac{24,87 \cdot 56}{56+24,87} = 17,22\ \Omega C$

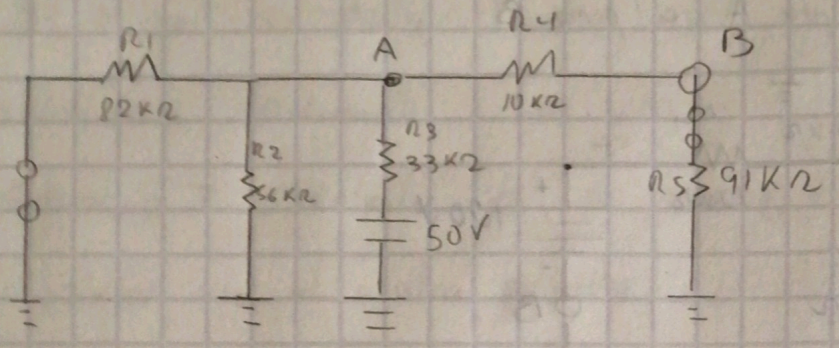
$\Omega C + R_1 = 17,22 + 82 = 99,22\ K\Omega RT$

$V_{AB_1} = V_{R4}$

$V_{AB_1} = 75 \cdot \frac{10}{99,22}$

$V_{AB_1} = 7,55\ V$

3)



$R_1 \parallel R_2 = \frac{82 \cdot 56}{82+56} = 33,27 \ R_A$

$R_4 + R_5 = 10 + 91 = 101 \ R_B$

$R_A \parallel R_B = \frac{33,27 \cdot 101}{33,27+101} = 25,02 \ R_C$

$R_C + R_3 = 25,02 + 33 = 58,02 \ K\Omega \ R_T$

$V_{AB_3} = V_T \cdot \frac{R_4}{R_T}$

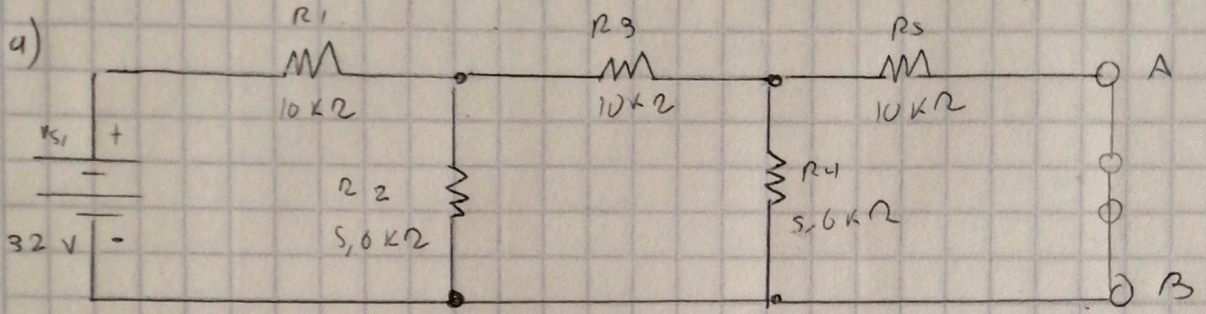
$V_{AB_3} = 8,61 \ V$

$V_{ABT} = V_{AB_1} + V_{AB_2} + V_{AB_3}$

$V_{ABT} = 9,56 \ V$

15. Determinar la corriente producida por cada una de las baterías cuando se conecta los terminales A (A o A) y los terminales B (B o B)

a)



$R_4 \parallel R_5 = \frac{10 \cdot 5,6}{10 + 5,6} = 3,589 K\Omega = R_B$

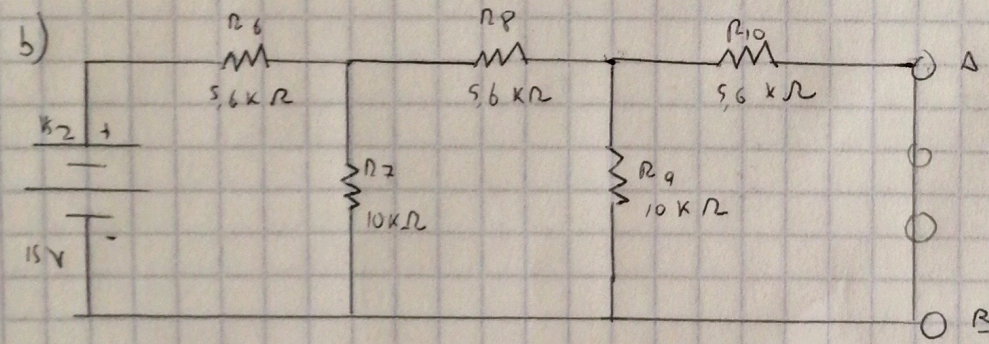
$R_B + R_3 = 13,589\ K\Omega = R_C$

$R_C \parallel R_2 = \frac{13589 \cdot 5,6}{13,589 + 5,6} = 3,96\ K\Omega = R_D$

$R_D + R_1 = 13,96\ K\Omega = R_{T_{S_1}}$

$I_{T_{S_1}} = \frac{V_{S_1}}{R_{T_{S_1}}} = \frac{32}{13,96 \times 10^3} = 2,29 \times 10^{-3} A = 2,29 mA$ //

b)



$R_{10} \parallel R_9 = \frac{10 \cdot 5,6}{10 + 5,6} = 3,584\ K\Omega = R_B$

$R_B + R_8 = 3,589 + 5,6 = 9,189\ K\Omega = R_C$

$R_C \parallel R_7 = \frac{9,189 \cdot 10}{9,189 + 10} = 4,78\ K\Omega = R_D$

$R_D + R_6 = 4,78 K + 5,6 = 10,38\ K\Omega = R_{T_{S_2}}$

$I_{T_{S_2}} = \frac{V_{S_2}}{R_{T_{S_2}}}$

$I_{T_{S_2}} = \frac{15}{10,38 \times 10^3}$

$I_{T_{S_2}} = 1,34 \times 10^{-3} A$

$I_{T_{S_2}} = 1,34 mA$ //