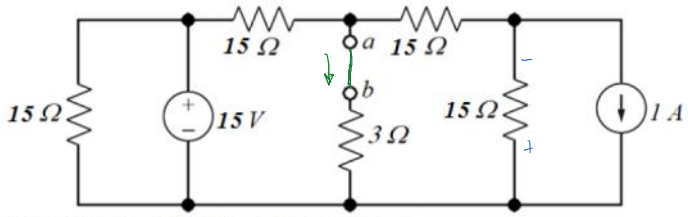
27 de agosto

viernes, 27 de agosto de 2021 2:13 p. m.



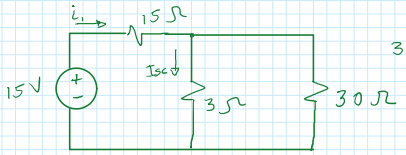
1. *(25 %) Encuentre el voltaje entre los nodos a y b*
2. *(25 %) Calcule la resistencia equivalente entre a y b si las dos fuentes son iguales a 0*

Entre a y b

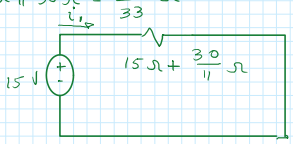
$V_{oc} = 5\ V$

$R_{TH} = 13\ \Omega$

$I_{sc} = \frac{5\ V}{13\ \Omega}$

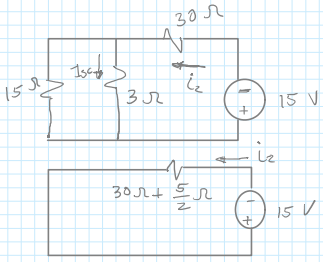


$3\ \Omega \parallel 30\ \Omega = \frac{90}{33}\ \Omega$



$i_1 = \frac{15\ V}{\frac{195}{11}\ \Omega} = \frac{165}{195}\ A = \frac{11}{13}\ A$

$I_{sc} = i_1 \cdot \frac{30}{33} = \frac{11 \cdot 30}{13 \cdot 33}\ A = \frac{10}{13}\ A$



$15\ \Omega \parallel 3\ \Omega = \frac{45}{18}\ \Omega = \frac{5}{2}\ \Omega$

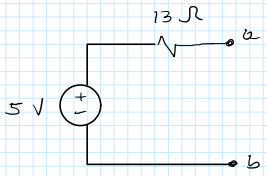
$i_2 = \frac{-15\ V}{\frac{65}{2}\ \Omega} = \frac{-30}{65}\ A = \frac{-6}{13}\ A$

$I_{sc} = i_2 \cdot \frac{15\ \Omega}{18\ \Omega} = \frac{-6 \cdot 15}{13 \cdot 18}\ A = -\frac{5}{13}\ A$

$I_{sc} = \frac{10}{13}\ A - \frac{5}{13}\ A$

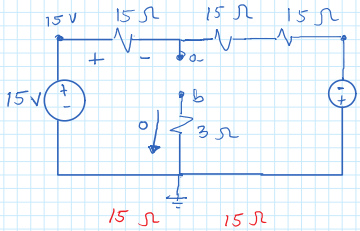
$I_{sc} = \frac{5}{13}\ A$

Equivalente de Thévenin



1)

$i = \frac{15\ V - (-15\ V)}{45\ \Omega} = \frac{2}{3}\ A$



$V_a = 15\ V - 15\ \Omega \cdot \frac{2\ A}{3}$

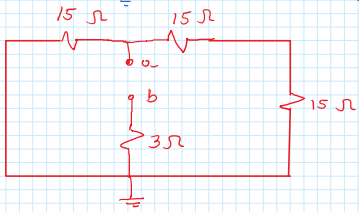
$V_a = 5\ V$

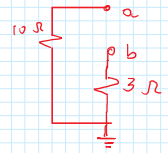
$V_b = 0\ V$

$V_{ab} = 5\ V$

2)

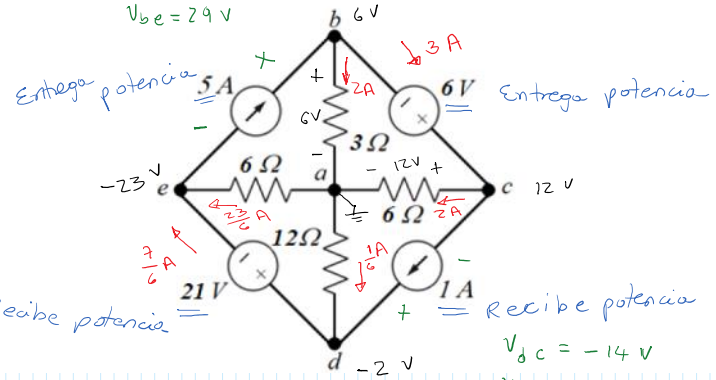
$15\ \Omega \parallel 30\ \Omega = 10\ \Omega$





$R_{ab} = 13\ \Omega$

3. *(25 %) Para el circuito de la siguiente figura calcule los voltajes V_{ba}, V_{ca}, V_{da}, y V_{ea}, si las fuentes de voltaje son iguales a 0*
4. *(25 %) Para el circuito de la siguiente figura calcule los voltajes V_{ba}, V_{ca}, V_{da}, y V_{ea}, si las fuentes de corriente son iguales a 0*



$V_{ba} = 8\ V - 2\ V = 6\ V$

$V_{ca} = 8\ V + 4\ V = 12\ V$

$V_{da} = -16\ V + 14\ V = -2\ V$

$V_{ea} = -16\ V - 7\ V = -23\ V$

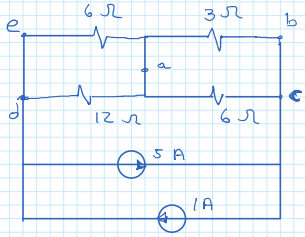
$V_{dc} = -14\ V$

$V_{cd} = +14\ V$

NODO A

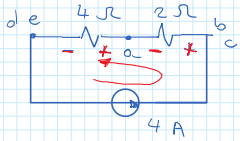
$2A + 2A - \frac{23}{6}\ A - \frac{1}{6}\ A = 0$

3)



$6\ \Omega \parallel 3\ \Omega = 2\ \Omega$

$12\ \Omega \parallel 6\ \Omega = 4\ \Omega$



$V_{ba} = V_{ca} = 4\ A \cdot 2\ \Omega = 8\ V$

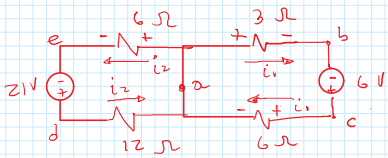
$V_{da} = V_{ea} = -4A \cdot 4\ \Omega = -16\ V$

$V_{ad} = V_a - V_d$

$V_{ad} = 4A \cdot 4\ \Omega$

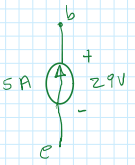
$V_{da} =$

4)

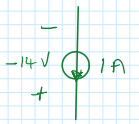


$i_1 = \frac{6\ V}{9\ \Omega} = \frac{2}{3}\ A$

$i_2 = \frac{21\ V}{18\ \Omega} = \frac{7}{6}\ A$



$P = 29V \cdot 5A = 145\ W$



$P = -14V \cdot 1A$

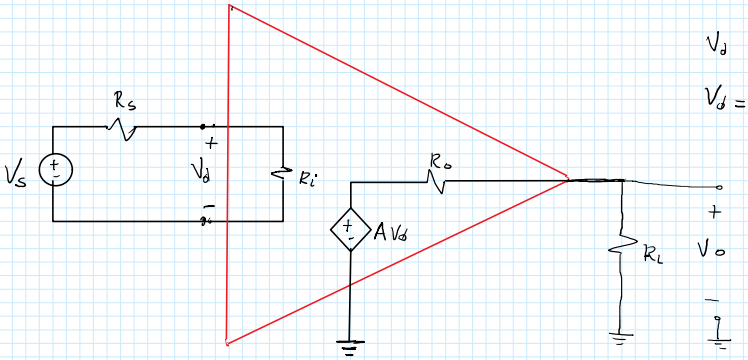
$P = -14\ W$

$V_{ba} = -\frac{2}{3}A \cdot 3\Omega = -2\ V$

$V_{ca} = \frac{2}{3}A \cdot 6\Omega = 4\ V$

$V_{ea} = -\frac{7}{6}A \cdot 6\Omega = -7\ V$

$V_{da} = \frac{7}{6}A \cdot 12\Omega = 14\ V$



$V_d \rightarrow$ Voltaje diferencial

$$V_d = V_s \frac{R_i}{R_i + R_s}$$

$$V_o = A V_d \frac{R_L}{R_L + R_o}$$

$$V_o = A \cdot V_s \frac{R_i}{R_i + R_s} \cdot \frac{R_L}{R_L + R_o}$$

$$\boxed{\frac{V_o}{V_s} = A \frac{R_i R_L}{(R_i + R_s)(R_L + R_o)}}$$

AMPLIFICADOR OPERACIONAL

$A \rightarrow \infty$

$R_i \rightarrow \infty$

$R_o \rightarrow 0$

$A \rightarrow$ GANANCIA

$R_i \rightarrow$ Resistencia de entrada

$R_o \rightarrow$ Resistencia de salida