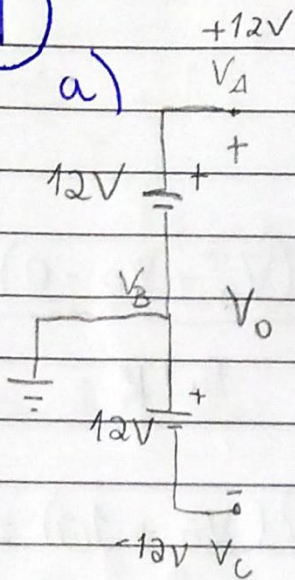


ATIVIDADE 1 - ELETRÔNICA

1

a)



$$V_O = V_A - V_C$$

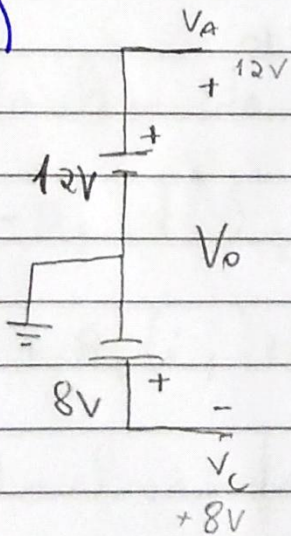
$$V_O = (V_A - 0) - (0 - V_C)$$

$$V_O = (12 - 0) - (0 - 12)$$

$$V_O = 12 + 12$$

$$\boxed{V_O = 24 \text{ V}}$$

b)



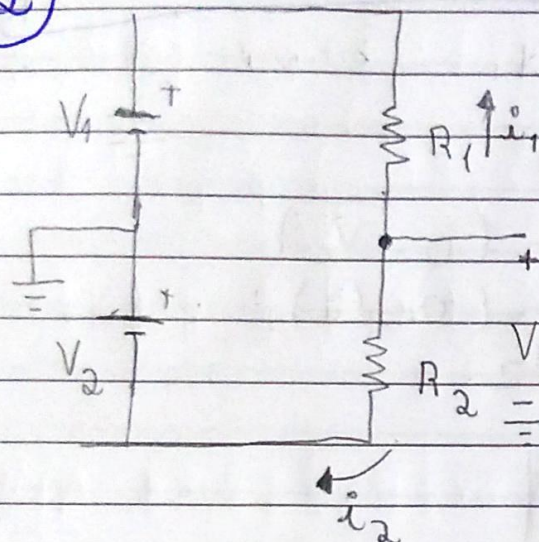
$$V_O = V_A - V_C$$

$$V_O = (12 - 0) - (0 + 8)$$

$$V_O = 12 - 8$$

$$\boxed{V_O = 4 \text{ V}}$$

②



$$V_1 = 5V / V_2 = 10V$$

$$R_1 = 10k\Omega / R_2 = 5.1k\Omega$$

$$i_1 + i_2 = 0$$

$$\frac{(V_0 - 5 - 0)}{10k} + \frac{(V_0 + 10 - 0)}{5.1k} = 0$$

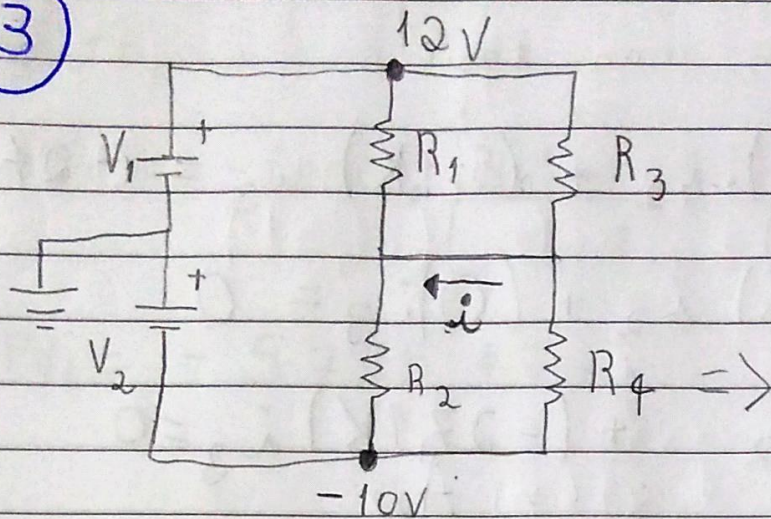
$$(5.1k)(V_0 - 5) + 10k(V_0 + 10) = 0$$

$$5.1k(V_0) - 25.5k + 10kV_0 + 100k = 0$$

$$15.1 V_0 = -74.5$$

$$V_0 = -4.93 V$$

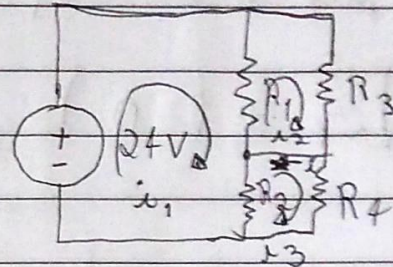
③



$$V_1 = 12V \quad | \quad V_2 = 10V$$

$$R_1 = 10K\Omega \quad | \quad R_2 = 5,1K\Omega$$

$$R_3 = 3,3K\Omega \quad | \quad R_4 = 22K\Omega$$



Analisando malha $i_1 \rightarrow$

$$24 - R_1 \cdot (i_1 - i_2) - R_2 \cdot (i_1 - i_3) = 0$$

$$(-R_1 - R_2) \cdot i_1 + (R_1) \cdot i_2 + R_2 \cdot i_3 = -24$$

1ª eq.

Analisando malha $i_2 \rightarrow$

$$-R_1 \cdot (i_2 - i_1) - R_3 \cdot i_2 = 0$$

$$+ R_1(i_1) + (-R_1 - R_3) \cdot i_2 + 0 \cdot i_3 = 0 \rightarrow 2^\text{a} \text{ eq.}$$

Analisando malha $i_3 \rightarrow$

$$-R_2 \cdot (i_3 - i_1) - R_4 \cdot (i_3) = 0$$

$$+ R_2(i_1) + (-R_2 - R_4) \cdot i_3 = 0 \rightarrow 3^\text{a} \text{ eq.}$$

/ /

Substituindo valores nas eqs:

$$(-15,1K) \cdot i_1 + (10K) \cdot i_2 + (5,1K) i_3 = -24$$

$$(10K) i_1 + (-13,3K) i_2 + (0) i_3 = 0$$

$$(5,1K) i_1 + (0) i_2 + (-27,1K) i_3 = 0$$

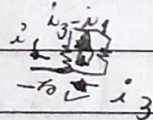
$$i_1 = 3,62 \text{ mA} \quad i_2 = 2,72 \text{ mA} \quad i_3 = 6,82 \text{ mA}$$

$$i = i_2 - i_3 = 2,72 \text{ m} - 6,82 \text{ m} = -4,1 \text{ mA}$$

As correntes estão certas, basta uma simples análise na malha i_3 , mais precisamente no nó $-10V$

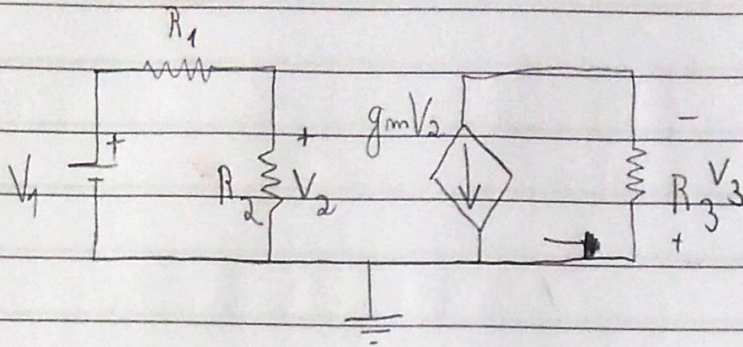
$$i_1 - i_3 + (i_3 - i_1) = 0$$

$$3,62 \text{ m} - 6,82 \text{ m} + 6,82 \text{ m}$$



Resposta para i : $i = -4,1 \text{ mA}$

4



$$V_1 = 9V \quad | \quad R_1 = 3,3k\Omega$$
$$R_2 = 1,2k\Omega \quad | \quad R_3 = 10k\Omega$$
$$g_m = 10mA/V \quad | \quad V_3 = ?$$

$$V_{R2} = V_2 = V_1 \cdot \left(\frac{R_2}{R_1 + R_2} \right) = 9 \cdot \frac{1,2k}{4,5k} = 2,4V //$$

$$V_3 = R_3 \cdot i_3 = 10k \cdot (10mA/V \cdot 2,4) = 240V //$$