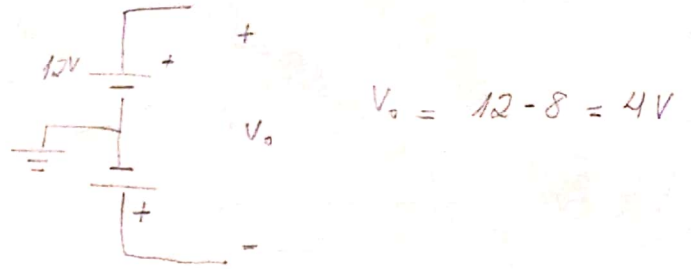
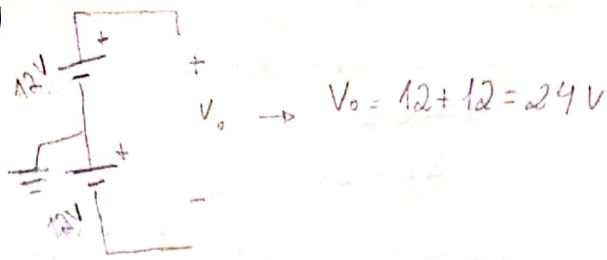
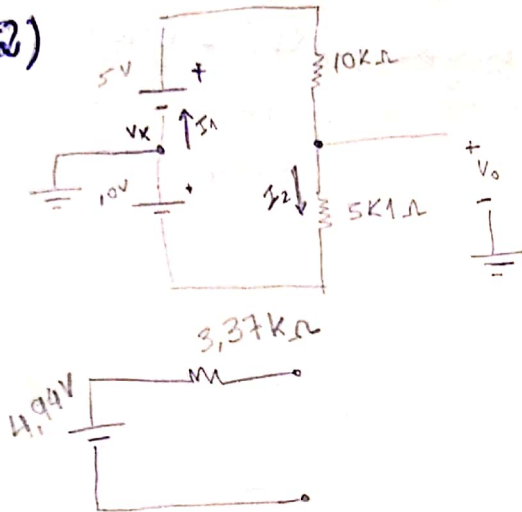


Elétrica

1)



2)



$$V_0 = I_1 - I_2$$

$$\left(\frac{-V_0 + 15}{10000} \right) - \left(\frac{V_0}{5100} \right) = 0$$

$$-V_0 + 15 - 1.96V_0 = 0$$

$$-2.96V_0 = -15$$

$$V_0 = 5.06V$$

$$V_{Th} = V_0 - V_2$$

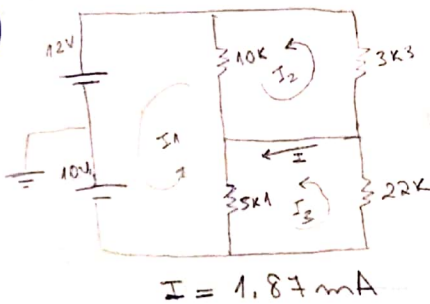
$$V_{Th} = 5.06 - 10$$

$$V_{Th} = -4.94V$$

$$R_{Th} = 10K // 5K$$

$$R_{Th} = 3.37K\Omega$$

3)



$$I = I_3 - I_2 \quad I = 1.87mA$$

$$\sum V = 0$$

$$12 + 10 + 5100I_1 - 5100I_3 + 10000I_1 - 10000I_2 = 0$$

$$15100I_1 - 10000I_2 - 5100I_3 = -22$$

$$\sum V = 0$$

$$I_2$$

$$3300I_2 + 10000I_2 - 10000I_1 = 0$$

$$-10000I_1 + 13300I_2 = 0$$

$$\sum V = 0$$

$$I_3$$

$$22000I_3 + 5100I_3 - 5100I_1 = 0$$

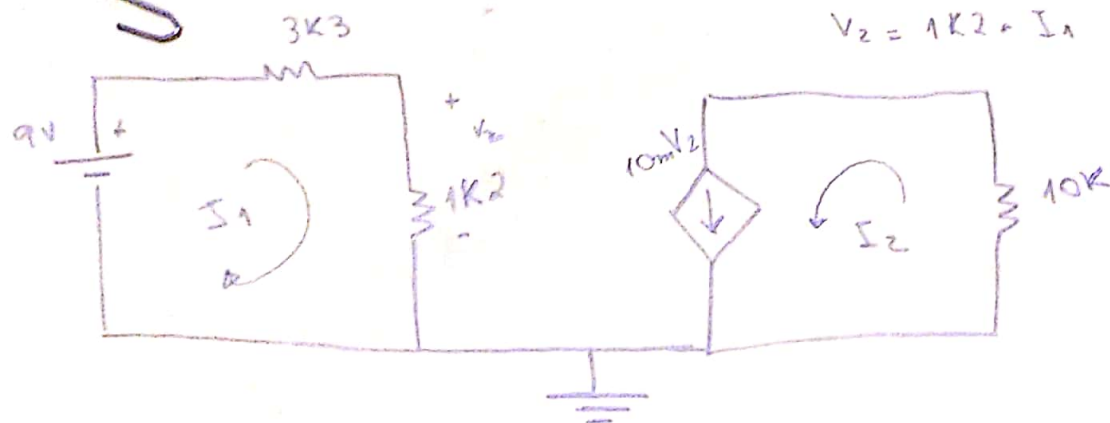
$$-5100I_1 + 27100I_3 = 0$$

$$I_1 = -3.32mA$$

$$I_2 = -2.49mA$$

$$I_3 = -6.25 \times 10^{-4}A$$

4)



$$\sum_{I_1} V_0$$

$$-9 + 3300 I_1 + 1200 I_1 = 0$$

$$4500 I_1 = 9$$

$$I_1 = 2 \times 10^{-3} \rightarrow 2 \text{ mA}$$

$$V_2 = 1200 \cdot 2 \times 10^{-3} = 2,4 \text{ V}$$

$$I_2 = 10 \text{ m} \cdot 2,4 = 24,0 \text{ mA}$$

$$V_3 = 10000 \cdot 2,4 \times 10^{-3} = 240 \text{ V}$$