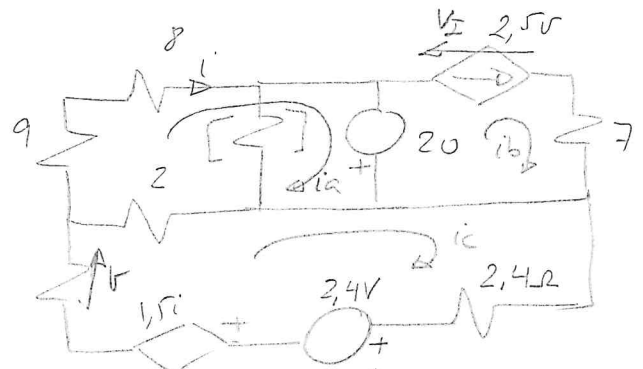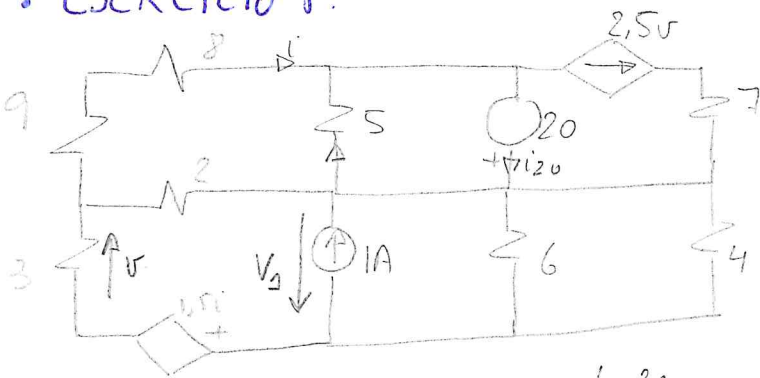# PARCIAL OCTUBRE 2024.

• EJERCICIO 1.

$$\begin{pmatrix} 19 & 0 & -2 \\ 0 & 7 & 0 \\ -2 & 0 & 7,4 \end{pmatrix} \begin{pmatrix} i_a \\ i_b \\ i_c \end{pmatrix} = \begin{pmatrix} 20 \\ V_I - 20 \\ -1,5i - 2,4 \end{pmatrix} \begin{matrix} 6ec \\ 6incg \end{matrix} \rightarrow \begin{cases} i_a = 1,026 \ A \\ i_b = -1,913 \ A \\ i_c = -0,255 \ A \\ V_I = 6,612 \ V \\ i = 1,026 \ A \\ v = -0,765 \ V \end{cases}$$

$i = i_a$

$i_b = 2,5v$

$v = 3i_c$

$i + \dfrac{20}{5} = i_{20} + 2,5v \Rightarrow i_{20} = 6,938A.$ $P_{20r} = 20 \cdot 6,938 = 138,77W \ (gen)$
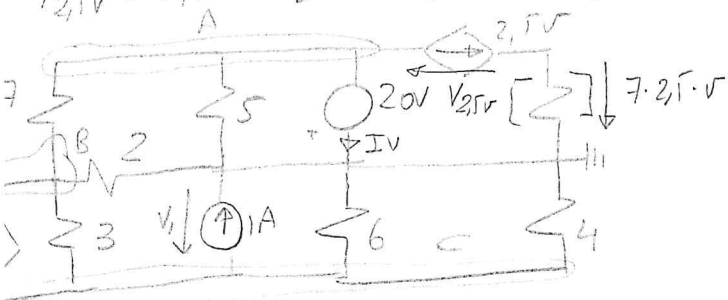
$V_1 = 2(i_a - i_c) - v - 1,5i \Rightarrow V_1 = 1,788V.$ $P_{1A} = 1 \cdot 1,788 = 1,788 \ W \ (gen)$

$P_{1,5i} = -1,5i \cdot i_c = 0,3924 w \ (gen)$

$P_{2,5V} = 2,5v \cdot V_I = -12,645W \rightarrow 12,645W \ (con)$

$$\begin{pmatrix} 1/7 + 1/17 & -1/17 & 0 \\ -1/17 & 1/2 + 1/3 + 1/7 & -1/3 \\ 0 & -1/3 & 1/3 + 1/4 + 1/6 \end{pmatrix} \begin{pmatrix} V_A \\ V_B \\ V_C \end{pmatrix} = \begin{pmatrix} -2,5v - I_v \\ -1,5i/3 \\ 1,5i/3 - 1 \end{pmatrix} \begin{matrix} 6ec \\ 6incg \end{matrix} \rightarrow \begin{cases} V_A = -20V \\ V_B = -2,562V \\ V_C = -1,788V \\ v = -0,765V \\ i = 1,026A \\ I_v = 6,938A \end{cases}$$

$0 - V_A = 20$

$V_C - V_B = 1,5i + v$

$i = (V_B - V_A)/17$

$20v = 20 \cdot I_v = 138,76W \ (gen)$
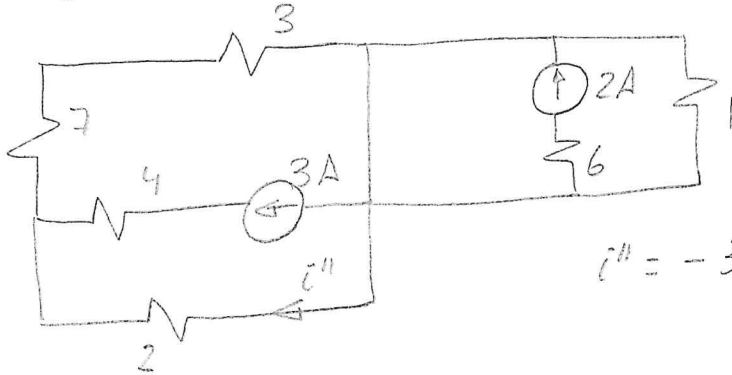
$1A = 1 \cdot V_1 = 1 \cdot (0 - V_C) = 1,788W \ (gen)$

$1,5i = 1,5i \cdot \dfrac{-v}{3} = 0,3924 \ W \ (gen)$

$2,5v = 2,5v \cdot (-V_A + 7 \cdot 2,5 \cdot v) = -12,646W \rightarrow 12,646 \ (con)$
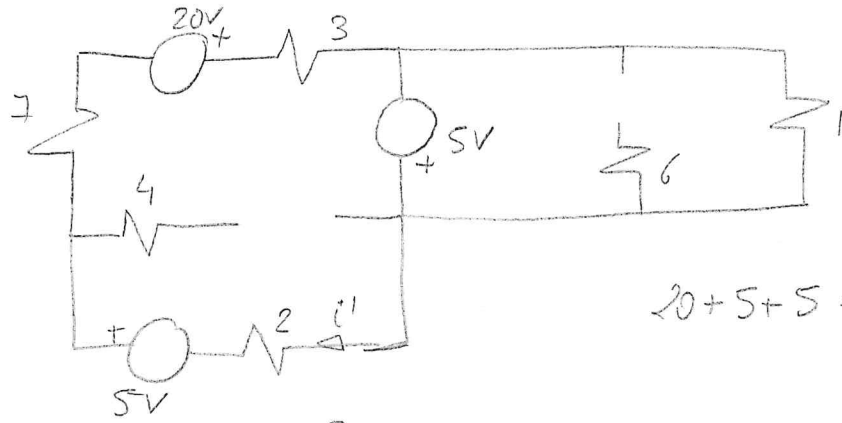
• EJERCICIO 2

$$20 + 5 + 5 = (7 + 3 + 2)i' \Rightarrow \quad i' = 2,5A.$$
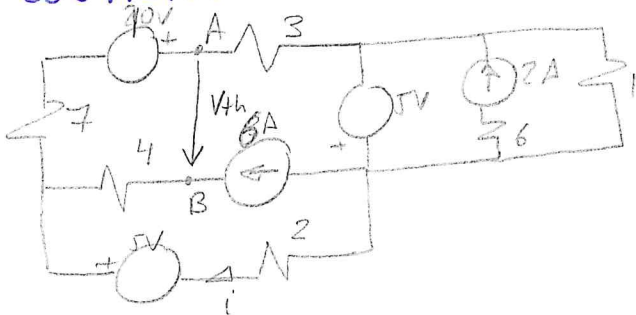

$$i'' = -3 \cdot \frac{10}{10+2} = -2,5A.$$

$$i = i' + i'' \Rightarrow \boxed{i = 0A}$$
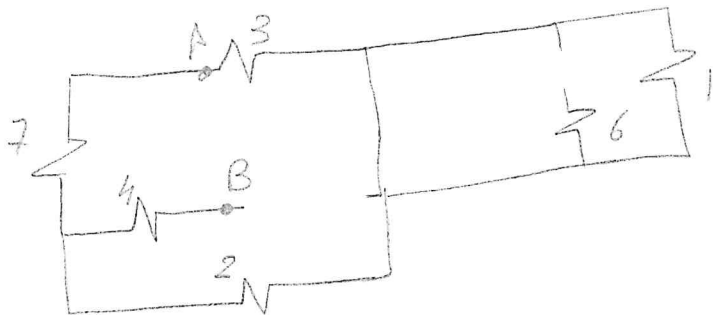
$$E_L = \frac{1}{2} L i_L^2 = \frac{1}{2} 2 (5)^2 = 25J$$

$$E_C = \frac{1}{2} C V_C^2 = \frac{1}{2} 3 (5)^2 = 37,5J.$$

• EJERCICIO 3

Por linealidad $i = 0A$

$$V_{th} = 40 - 6 (7+4) = -26V$$

$$R_{th} = 4 + 7 // (3+2) = 6,9L\Omega$$

$$R^{max} = R_{th} = 6,9L\Omega$$

$$p^{max} = \frac{V_{th}^2}{4R_{th}} = 24,45W.$$