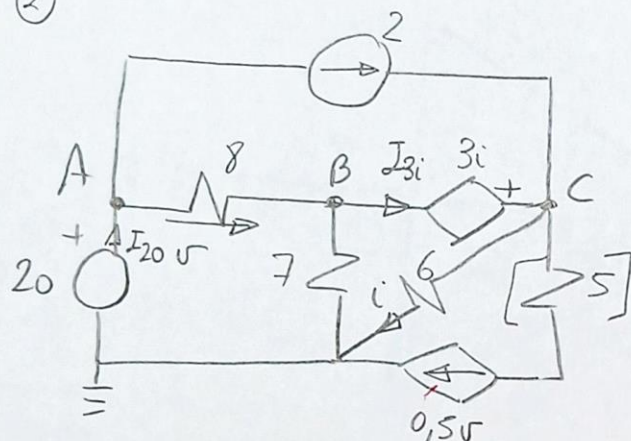$$\begin{pmatrix} 8 & -8 & 0 & 0 \\ -8 & 15 & -7 & 0 \\ 0 & -7 & 13 & -6 \\ 0 & 0 & -6 & 11 \end{pmatrix} \begin{pmatrix} i_a \\ i_b \\ i_c \\ i_d \end{pmatrix} = \begin{pmatrix} V_2 - 3i \\ 20 \\ 3i \\ V_{05} \end{pmatrix}$$

Ec. adicionales:

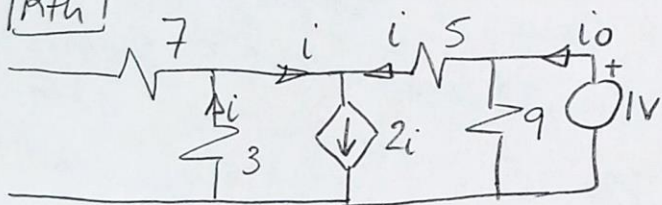$$i_a = 2 \qquad i = i_c - i_d \qquad i_d = 0,5v \qquad v = 8(i_b - i_a)$$

②

$$\begin{pmatrix} \frac{1}{8} & -\frac{1}{8} & 0 \\ -\frac{1}{8} & \frac{1}{7} + \frac{1}{8} & 0 \\ 0 & 0 & \frac{1}{6} \end{pmatrix} \begin{pmatrix} v_A \\ v_B \\ v_C \end{pmatrix} = \begin{pmatrix} I_{20} - 2 \\ -I_{3i} \\ 2 + I_{3i} - 0,5v \end{pmatrix}$$

Ec. adicionales

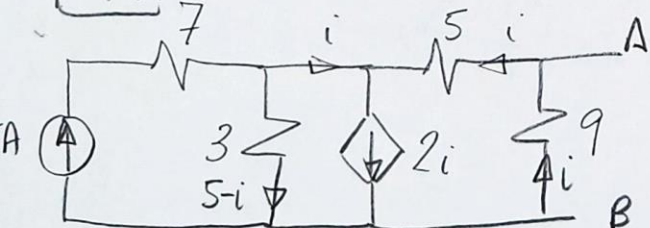$$v_A = 20 \qquad v_C - v_B = 3i \qquad i = v_C/6 \qquad v = v_A - v_B$$

③ 箱Rth

$$LKT \to 1 = 5i - 3i \Rightarrow i = 0,5A$$

$$LKI \to i_0 = \frac{1}{9} + i \Rightarrow i_0 = \frac{11}{18}A$$

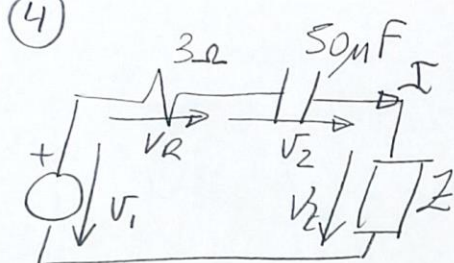$$R_{th} = \frac{1}{i_0} = \frac{18}{11}\Omega \qquad \boxed{R^{max} = R_{th} = 1,63\Omega}$$

箱Vth

$$LKT \to 5i + 3(5-i) + 9i = 0 \Rightarrow i = \frac{-15}{11}A$$

$$V_{AB} = -9i = 12,27V \qquad \boxed{V_{th} = 12,27V}$$

$$p_{max} = \frac{V_{th}^2}{4R_{th}} \Rightarrow \boxed{p_{max} = \frac{12,27^2}{4 \cdot 1,63} = 23,09W}$$

(4)

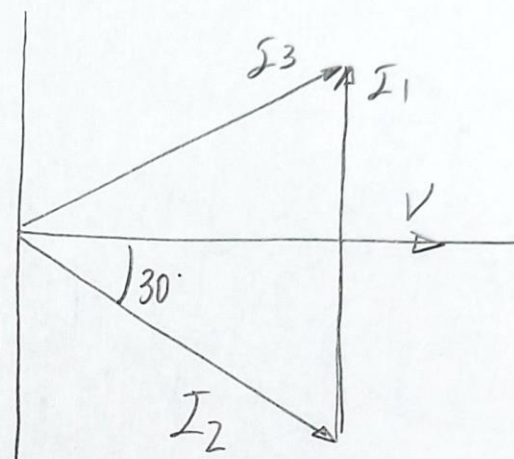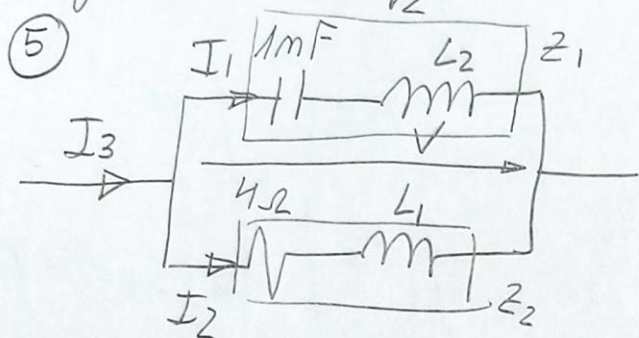$$v_2(t) = 200\cos(100t - 30°) \rightarrow V_2 = \frac{200}{\sqrt{2}}\angle{-30°}$$

$$v_1(t) = 100\cos(100t) \rightarrow V_1 = \frac{100}{\sqrt{2}}\angle 0°$$

$$Z_c = -20j \qquad Z_R = 3$$

$$I = \frac{V_2}{Z_c} = \frac{200/\sqrt{2}\ \angle{-30°}}{20\ \angle{-90°}} = 7{,}071\angle 60° \qquad V_R = Z_R I = 3\cdot 7{,}071\angle 60° = 21{,}21\angle 60$$

$$V_Z = V_1 - V_R - V_2 = 576{,}408\angle 521° \qquad \boxed{Z = \frac{V_2}{I} = 81{,}517\angle{-54{,}79°} = 47 - 66{,}6j}$$

$$S_g = V_1 I^* = \frac{100}{\sqrt{2}}\angle 0°\ (7{,}071\angle 60°)^* = \underbrace{2500}_{P} - \underbrace{4330i}_{Q}$$

(5)

$$\phi_2 = 30° \Rightarrow \text{tg } 30° = \frac{\omega L_1}{4} \Rightarrow \boxed{L_1 = 23{,}09\text{mH}}$$

$$\left.\begin{array}{l} Z_1 = -10j + \omega L_2 j \ (\text{capacitivo}) \\[4pt] |Z_1| = |Z_2| = 4{,}6188 \end{array}\right\} \rightarrow -10j + \omega L_2 j = -4{,}618j \Rightarrow \boxed{L_2 = 53{,}82\text{mH}}$$

(6)
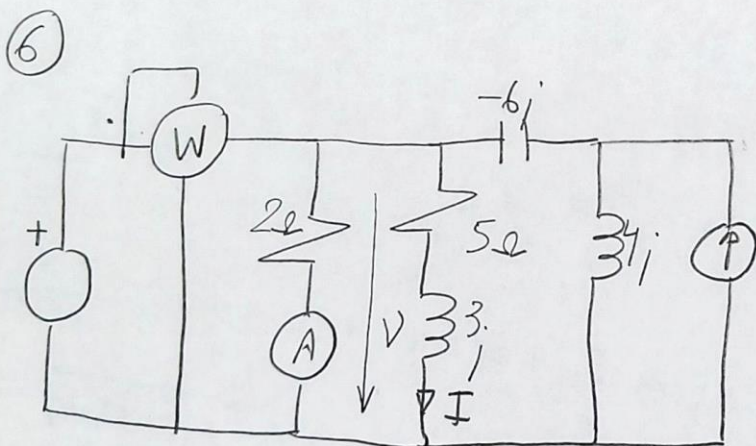
Como el vatímetro marca 0w, la potencia activa generada por la fuente de intensidad es la misma que la consumida por las resistencias de 2Ω y 5Ω.

$$P_{2\Omega} = 2\cdot 4^2 = 32W.$$

$$V = 2\cdot 4 = 8V \qquad I = \frac{V}{5+3j} = \frac{8}{5+3j} = 1{,}372\angle{-30{,}96°}$$

$$P_{5\Omega} = 5\cdot |I|^2 = 5\cdot 1{,}372^2 = 9{,}41W$$

$$P_T = P_{2\Omega} + P_{5\Omega} \Rightarrow \boxed{P_T = 41{,}41W}$$