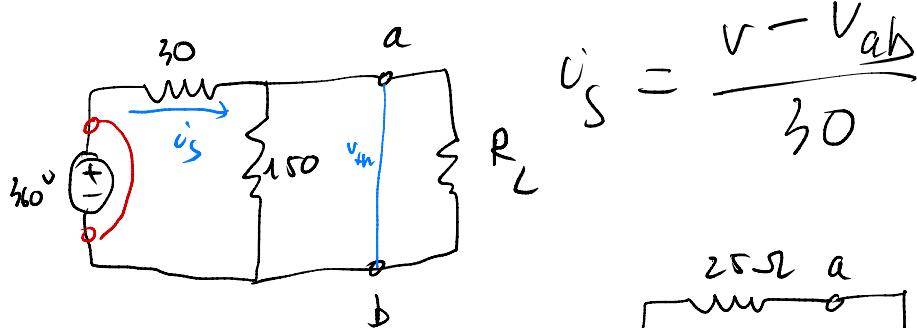


$$P_{\max} \Leftrightarrow R_L = R_{th} \quad \text{Phối hợp + rd' khang giữa tải và nguồn}$$

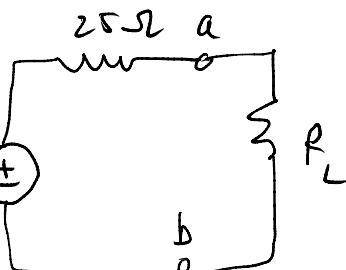


$$V_{th} = \frac{150}{150 + 30} \times 360 = 300V$$

$$i_s = \frac{V - V_{ab}}{30}$$

$$R_{th} = \frac{150 \times 30}{150 + 30} = 25 \Omega \quad (\text{short-circuit})$$

$$\Rightarrow R_L = R_{th} \Rightarrow P_{\max} = \left(\frac{300}{50} \right)^2 \times 25 = 900W$$



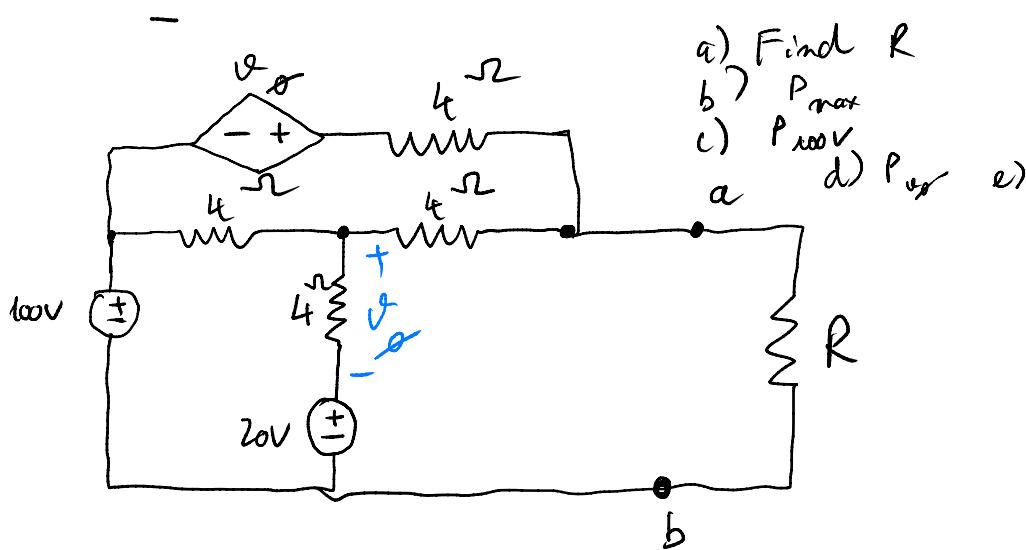
c) Real power transfer

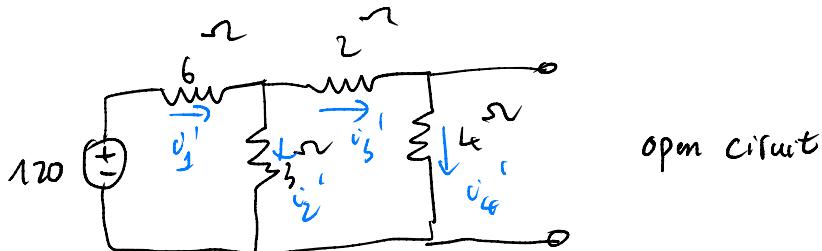
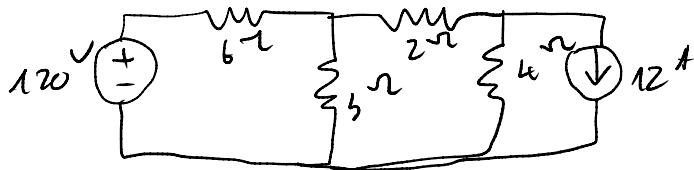
$$V_{ab} = \left(\frac{300}{50} \right) \times 25 = 150V$$

$$i_s = \frac{360 - 150}{30} = \frac{210}{30} = 7A$$

$$P_s = (-7)(360) = -2520W$$

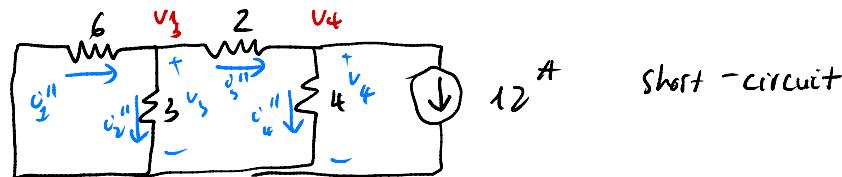
$$\frac{900}{2520} \times 100 = 35.71\%$$





$$\frac{v_1 - 120}{6} + \frac{v_1}{3} + \frac{v_1}{2+4} = 0 \Rightarrow v_1 = 30V$$

$$i_1' = \frac{120 - 30}{6} = 15, i_2' = \frac{30}{3} = 10A, i_3' = i_4' = \frac{30}{6} = 5A$$

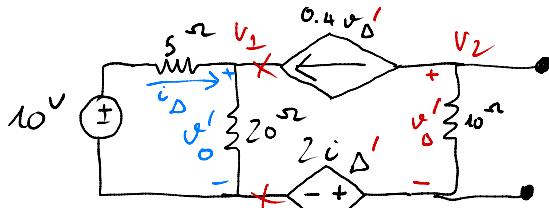
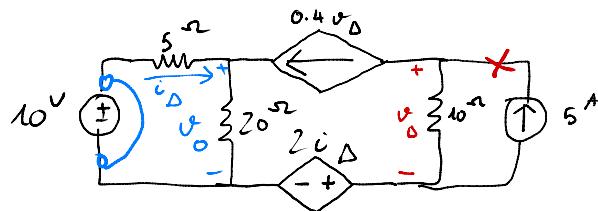


$$\left\{ \begin{array}{l} \frac{v_3}{3} + \frac{v_3}{6} + \frac{v_3 - v_4}{2} = 0 \\ \frac{v_4 - v_3}{2} + \frac{v_4}{4} + 12 = 0 \end{array} \right. \Rightarrow \left\{ \begin{array}{l} v_3 = -12V \\ v_4 = -24V \end{array} \right.$$

$$\Rightarrow i_1'' = \frac{0 - v_3}{6} = 2A, i_2'' = \frac{v_3}{3} = -4A, i_3'' = \frac{-12 + 24}{2} = 6A$$

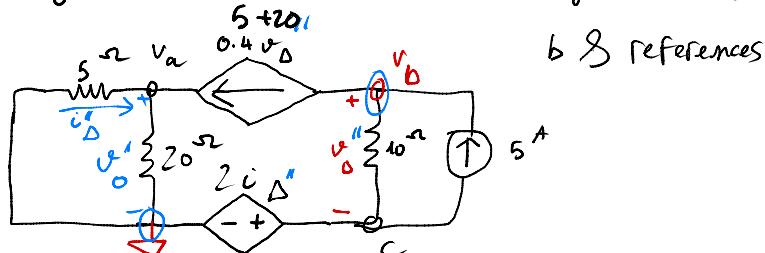
$$i_4'' = -\frac{24}{4} = -6A$$

$$\left\{ \begin{array}{l} i_1 = 15 + 2 = 17 \\ i_2 = 10 - 4 = 6 \\ i_3 = 5 + 6 = 11 \\ i_4 = 5 - 6 = -1 \end{array} \right.$$



$$KVL: v'_Δ = -0.4v'_Δ \times 10 \rightarrow v'_Δ = 0$$

$$V-D: v'_0 = 20 \times \frac{10}{5+20} = 8 \text{ V (Voltage-Divider)}$$



Node voltage at B:

$$v'_b = \frac{v'_c}{2i''_Δ} + v''_Δ \quad ; \quad \begin{cases} \frac{v''_0}{5} + \frac{v''_0}{20} - 2i''_Δ = 0 \\ 0.4v''_Δ + \frac{v_b - v_c}{10} - 5 = 0 \end{cases} \Rightarrow \begin{cases} v''_Δ = 10 \text{ V} \\ v''_0 = 16 \text{ V} \end{cases}$$

$$v'_0 = v'_0 + v''_0 = 8 + 16 = 24 \text{ V}$$

$$v''_0 = 16 \text{ V}$$

