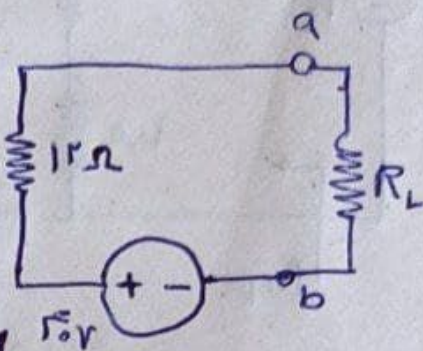
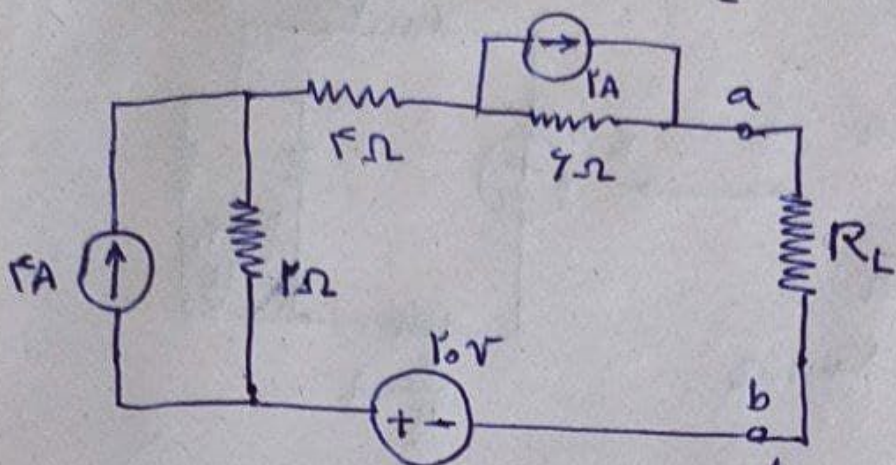


(۲)



تبدیل منابع و پیرانیدگی از مقاومت ها

$$I = \frac{V}{R} = \frac{40}{12+8} = 2A$$

(الف)

$$P = \frac{V_L^2}{R_L} = \frac{1600 R_L}{(R_L + 12)^2}$$

(ب)

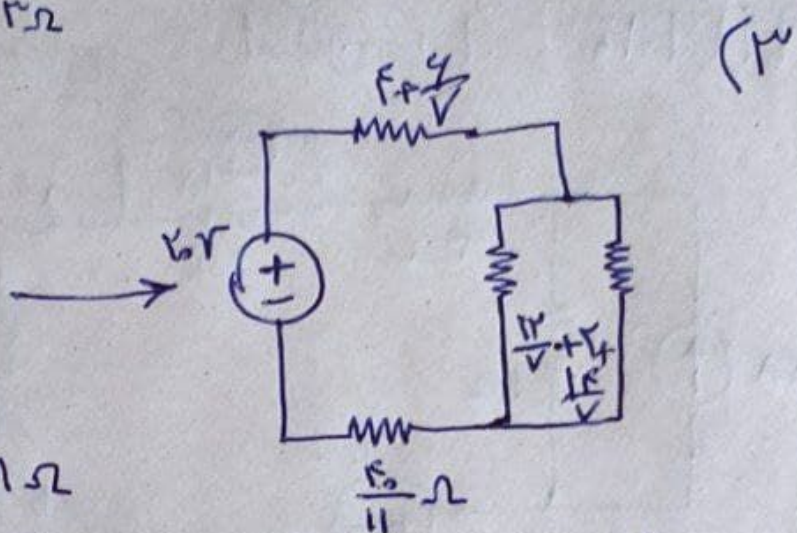
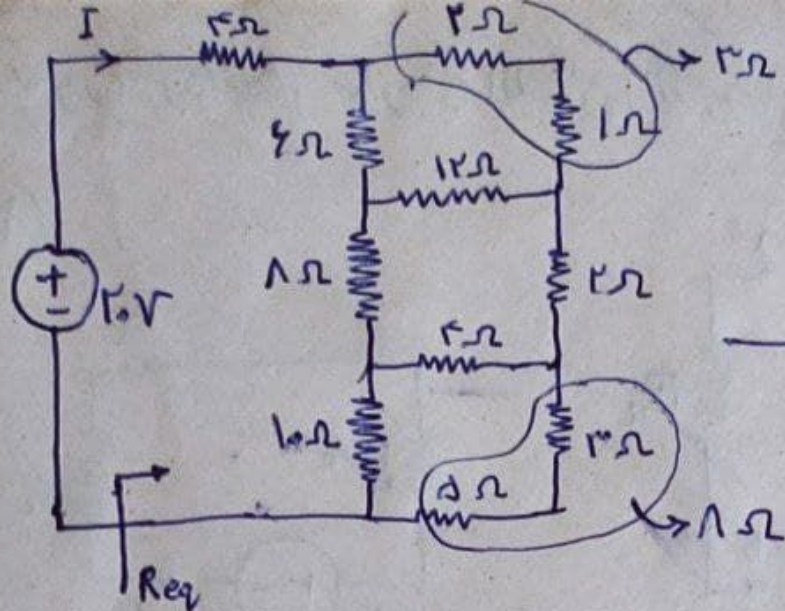
$$\hookrightarrow \frac{dP}{dR_L} = 1600(R_L + 12)(R_L + 12 - 2R_L) = 0 \rightarrow R_L = 12\Omega, R_L = -12\Omega$$

پایین قابل قبول : $R_L = 12\Omega$

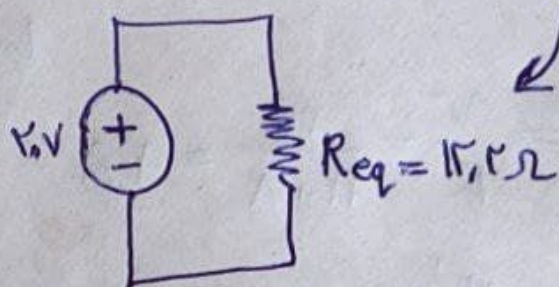
$$P_{max} = \frac{V_L^2}{R_L}, R_L = 12\Omega$$

(ج)

$$\Rightarrow P_{max} = \frac{\left(40 \times \frac{12}{12+12}\right)^2}{12} = \frac{100}{3} W \approx 33.3 W$$

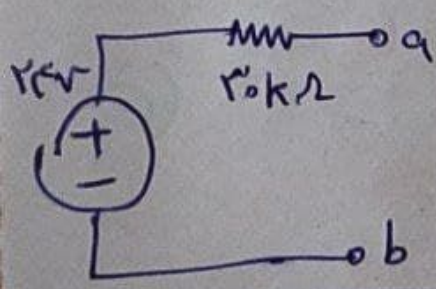


$$I = \frac{V}{R_{eq}} = \frac{10}{11.2} = 1.95 \text{ A}$$



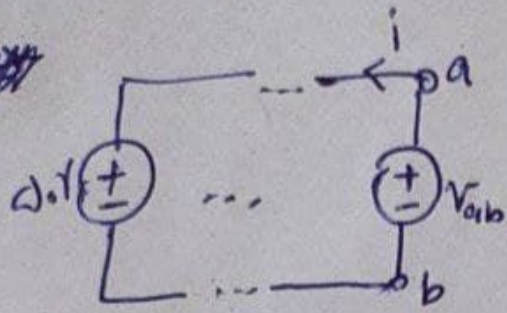
$$V_{ab} = \frac{R_{ab}}{R_{ab} + R_{TH}} \times V_{TH} \rightarrow \frac{10 \times 10^3 \times V_{TH}}{10 \times 10^3 + R_{TH}} = 7 \quad (\text{الف})$$

$$\& \rightarrow \frac{10 \times 10^3 \times V_{TH}}{10 \times 10^3 + R_{TH}} = 7 \Rightarrow R_{TH} = 10 \times 10^3 \Omega, V = 25 \text{ V}$$



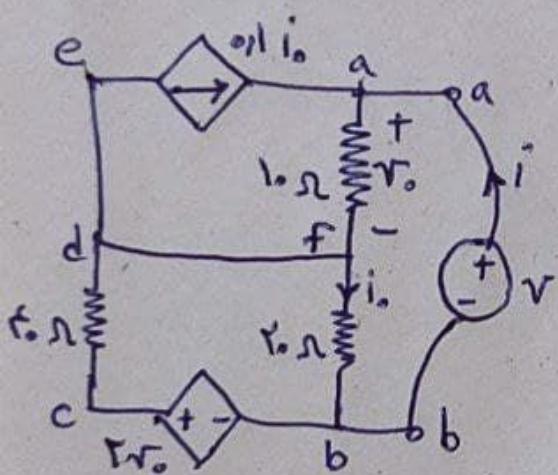
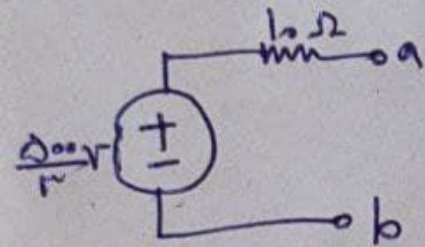
$$V_{ab} = \frac{10 \times 10^3 \times 25}{10 \times 10^3 + 10 \times 10^3} = \frac{25}{2} \text{ V} = 12.5 \text{ V}$$

$$V_{ab} = V \left(i - \frac{V_{ab}}{10} + \frac{V_n}{1} \right) + V \left(i - \frac{V_{ab}}{10} + \frac{V_n}{1} - \frac{V_n}{7} \right) + \Delta \cdot (a) \quad (a)$$



$$\Rightarrow V_{ab} = 10 i_{ab} + \frac{\Delta \cdot V}{10}$$

$$\hookrightarrow R_{TH} = 10 \Omega, \quad V_{TH} = \frac{\Delta \cdot V}{10}$$



$$V_0 = i_0 + 10 i$$

$$KVL_{bedf} : 10 i_0 - 10 i + 10 i_0 - 10 i_0 - 10 i = 0$$

$$KVL_{abf} : V = V_0 + 10 i_0$$

$$\rightarrow i_0 = \frac{V_0}{10} \quad , \quad \rightarrow 11 i_0 + 10 i = V$$

$$\Rightarrow V = 10 i + 11 \times \frac{V_0}{10}$$

$$: \text{نابراین} : V = R_{TH} i + V_{TH} \quad \text{می دانیم}$$

$$V_{TH} = 0, \quad R_{TH} \approx 11.1 \Omega$$