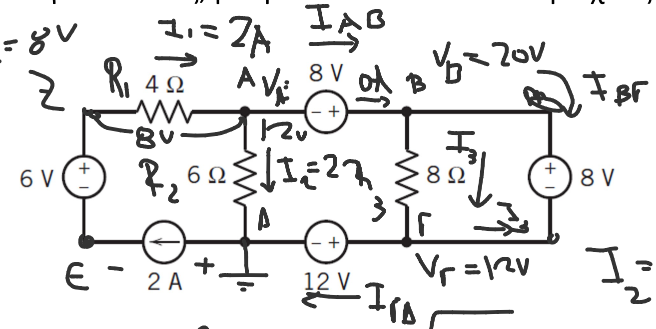
Ασκήσεις Βασικά Ηλεκτρικά κυκλώματα πηγές - Αντιστάσεις

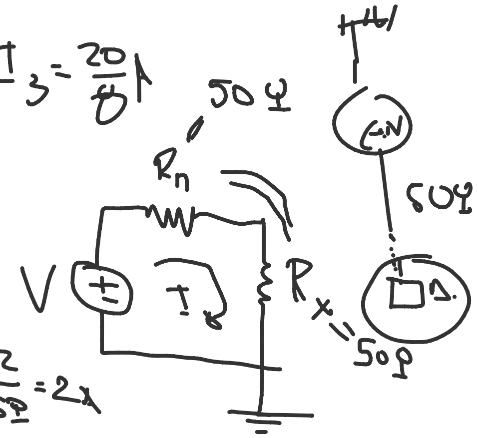
Monday, May 4, 2020 11:30 PM

Υπολόγισε Τάσεις, ρεύματα και κατανάλωση ισχύος

$V_{2A} = 4 \cdot 2 = 8V$



$I_3 = \frac{20}{8} A$



$I_2 = \frac{12}{6\Omega} = 2A$

$0.5 W = R I^2 \Rightarrow I = \sqrt{\frac{0.5}{8}} = 250 mA$

$P_x = V_x \cdot I = \frac{V_x^2}{R_x} = R_x I^2$

$V_\Delta = \emptyset$

$$\boxed{V = R \cdot I}$$

$I = \frac{V}{R_n + R_x}$

A: $I_1 - I_{AB} - I_2 = \emptyset$ | $V_{\Delta E} - 6 + V_{2A} + V_{A\Delta} = \emptyset$

B: $I_{AB} + I_3 - I_{B\Gamma} = \emptyset$

Γ: $I_3 + I_{B\Gamma} - I_{\Gamma\Delta} = \emptyset$

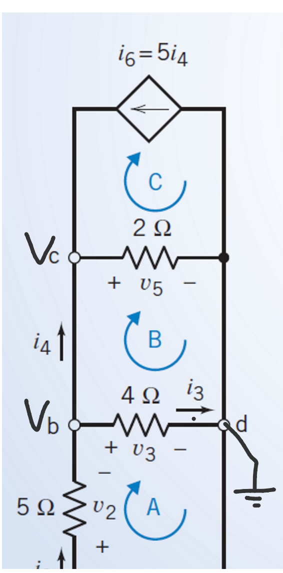
Δ: $I_{\Gamma\Delta} + I_2 - I_1 = \emptyset$

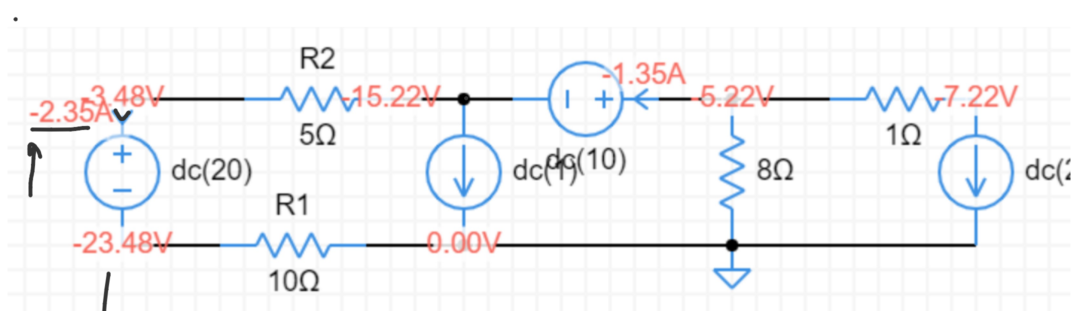
$P_x = R_x \frac{V^2}{(R_n + R_x)^2} \Rightarrow$

$\max_{R_x} P_x$

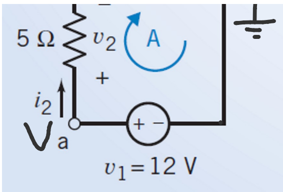
$\frac{\partial P_x}{\partial R_x} = \emptyset = \frac{V^2}{(R_n+R_x)^2} - \frac{2R_x V^2 (R_n+R_x)}{(R_n+R_x)^3}$

$= \emptyset \Rightarrow \boxed{R_n = R_x}$



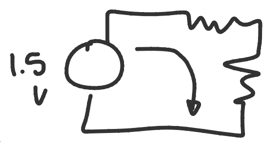


$P = 20 \times 2.35 W$

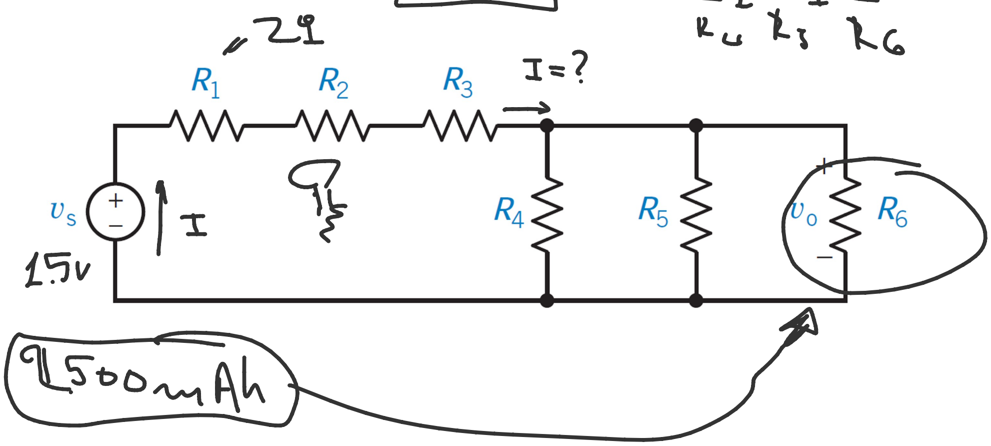


$P = 20 \times 2.35\,W$

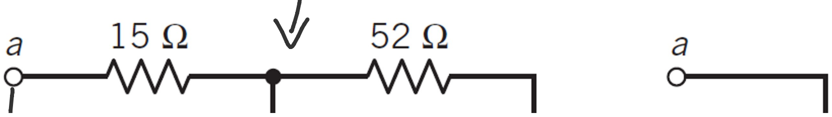
$$12 = 5I_2 + 4I_3$$
$$V_b = V_c = 2I_5$$
$$I_2 = I_3 + I_4$$
$$6I_4 = I_5$$

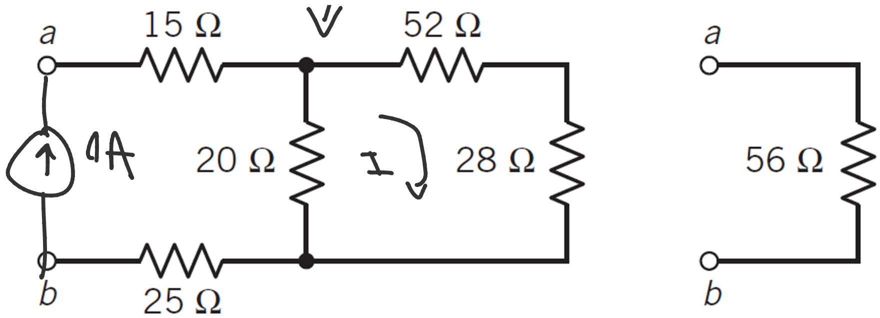


$$R_x = \frac{1}{\frac{1}{R_4} + \frac{1}{R_5} + \frac{1}{R_6}}$$

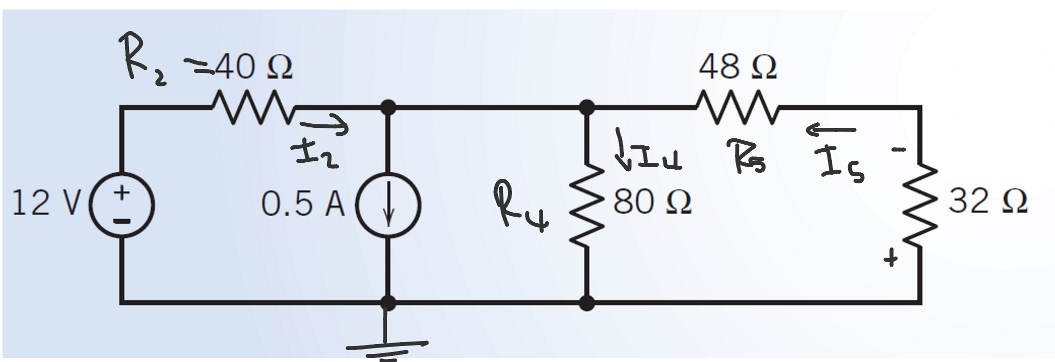


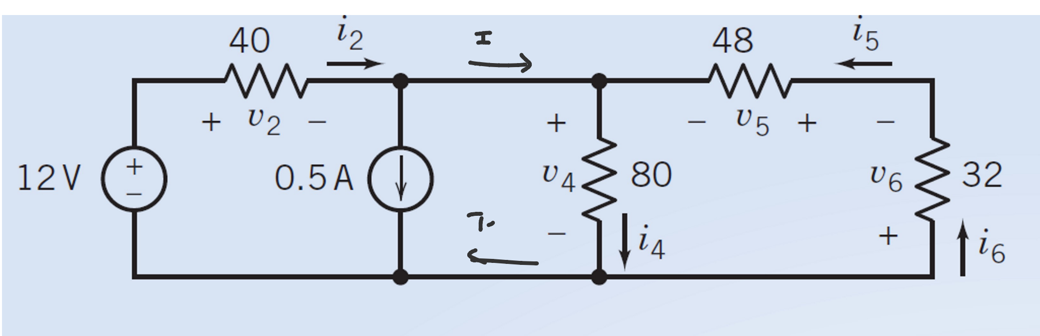
$$R = 25 + 15 + 20 // (52 + 28) = 56$$





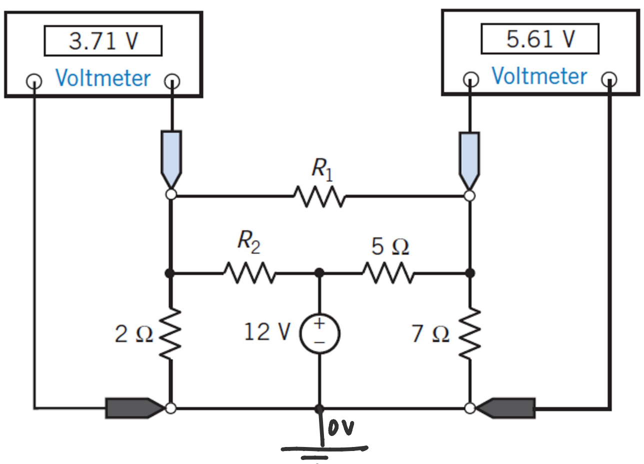
ΑΣΚΗΣΗ: ΥΠΟΛΟΓΙΣΕ ΡΕΥΜΑΤΑ ΚΑΙ ΤΑΣΕΙΣ

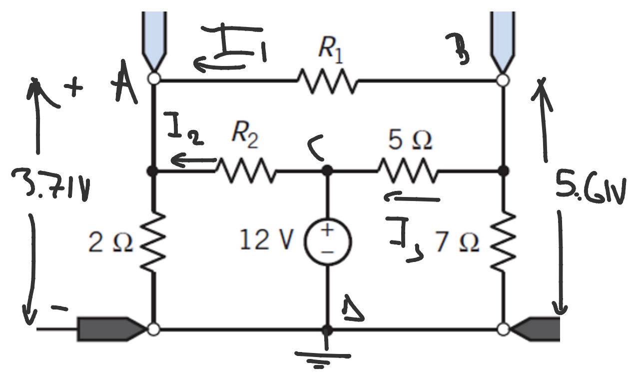




$$
\begin{bmatrix} 1 & -1 & 1 & 0 \\ 0 & 0 & 1 & -1 \\ 40 & 80 & 0 & 0 \\ 0 & 80 & 48 & 32 \end{bmatrix}
\begin{bmatrix} i_2 \\ i_4 \\ i_5 \\ i_6 \end{bmatrix}
=
\begin{bmatrix} 0.5 \\ 0 \\ 12 \\ 0 \end{bmatrix}
$$

Άσκηση 6η:
Υπολογίστε τις R_1, R_2





$$
\left.\begin{aligned} V_A &= 3.71V \\ V_B &= 5.61V \\ V_\Gamma &= 12V \end{aligned}\right\} \Rightarrow \begin{aligned} R_1 &= ? \\ R_2 &= ? \end{aligned}
$$

$$
A \cdot \begin{bmatrix} R_1 \\ R_2 \\ I_1 \end{bmatrix} = B
$$

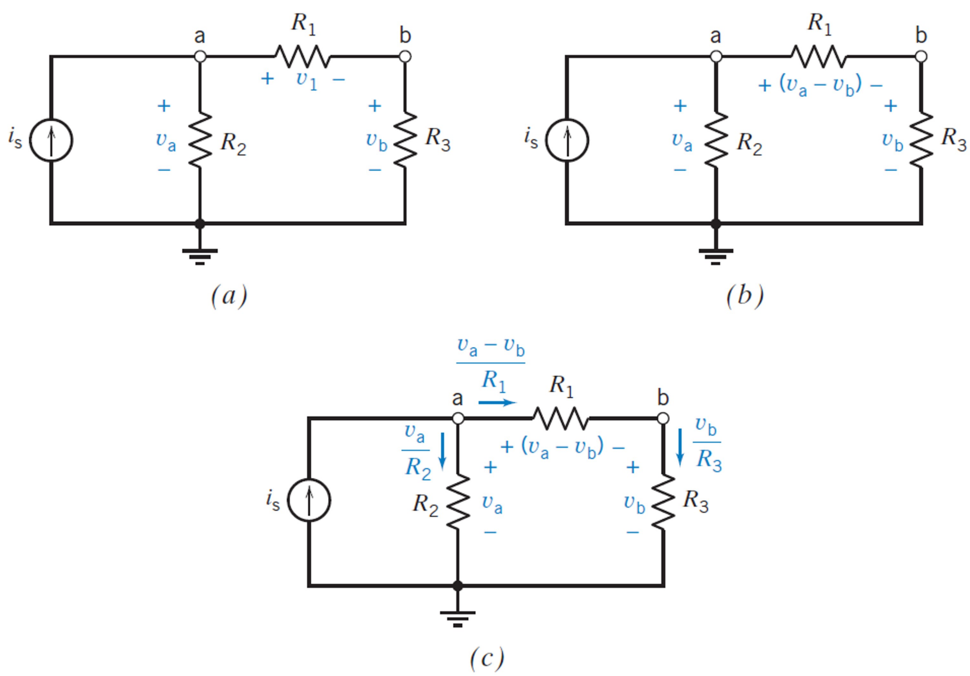
I_2
I_3
⋮

⇒ ....

Μέθοδοι επίλυσης

To write a set of node equations, we do two things:

1. Express element currents as functions of the node voltages.
2. Apply Kirchhoff's current law (KCL) at each of the nodes of the circuit except for the reference node.



ΠΑΡΑΔΕΙΓΜΑ