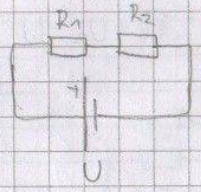
2-7.



$R_1 = R_2$

$U_1 + U_2 = U$

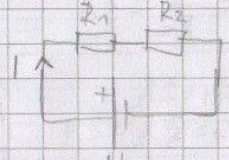
$U_1 = U_2 = \frac{U}{2} = \frac{U_m}{2}$

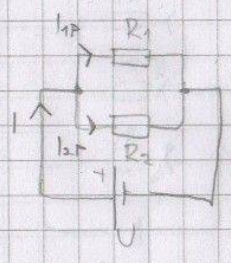
$$P = P_1 + P_2 = \frac{U_1^2}{R} + \frac{U_2^2}{R} = \frac{\frac{U_m^2}{4} + \frac{U_m^2}{4}}{R} = \frac{\frac{U_m^2}{2}}{R} = \frac{U_m^2}{2R}$$

$$P_m = \frac{U_m^2}{R} \qquad P = \frac{P_m}{2}$$

2-8.

$P_{1S} : P_{2S} = 3 : 2$





$2P_{1S} = 3P_{2S}$

$2I^2 R_1 = 3I^2 R_2$

$2R_1 = 3R_2$

$$I_{1P} = I \frac{R_2}{R_1 + R_2} = I \frac{R_2}{\frac{3}{2}R_2 + R_2} = \frac{2}{5} I$$

$$I_{2P} = \frac{3}{5} I$$

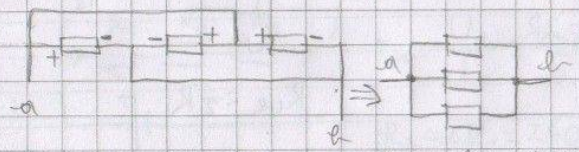
$$\frac{P_{1P}}{P_{2P}} = \frac{U I_{1P}}{U I_{2P}} = \frac{\frac{2}{5} I}{\frac{3}{5} I} = \frac{2}{3}$$

2-9.

$R = 10\,\Omega$

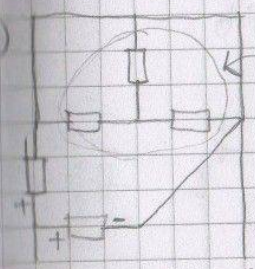
$R_{UK} = ?$

a)



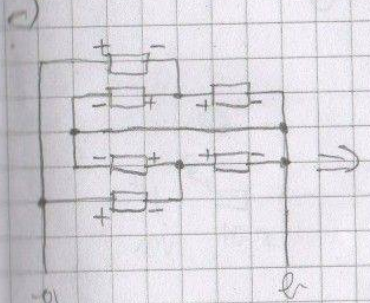
$R_{UK} = \frac{1}{3} R = 3.33\,\Omega$

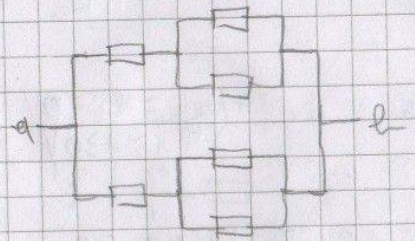
b)



$R_{UK} = \frac{1}{2} R = 5\,\Omega$

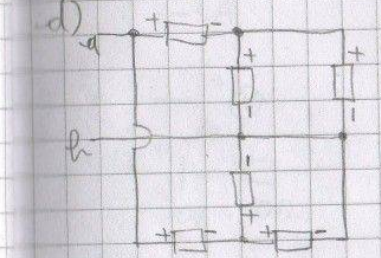
c)





$R_{UK} = \frac{1}{2}\left(10 + \frac{10}{2}\right) = 7.5$

d)



PRETVORI SE U ISTI SPOJ KAO POD c)

$U_{R5} = \varphi_2 - 0 = 10\,V = U_{R4}$

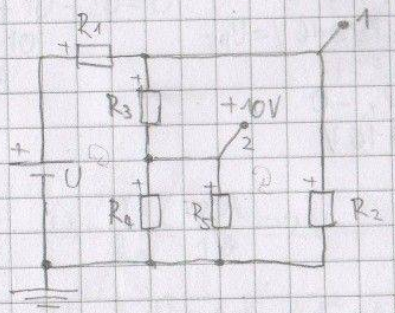
2-10.

$\varphi_1 = ?$

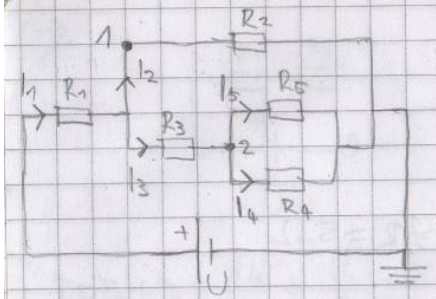
$U = ?$

$\varphi_2 = 10\,V$

$R = 10\,\Omega$



PRETVORIO SAM OVO U SPOJ NA SLICI NA IDUĆOJ STRANICI JER MI JE TAKO LAKŠE RAČUNATI :)



$I_5 = \frac{U_{R5}}{R_5} = 1A \quad I_4 = \frac{U_{R4}}{R_4} = 1A$

$I_3 = I_4 + I_5 = 2A$

$U_{R3} = I_3 R_3 = 20V$

$-U_{R2} + U_{R4,5} + U_{R3} = 0$

$U_{R2} = 30V$

$I_2 = \frac{U_{R2}}{R_2} = 3A$

$I_1 = I_2 + I_3 = 5A$

$U_{R1} = I_1 R_1 = 50V$

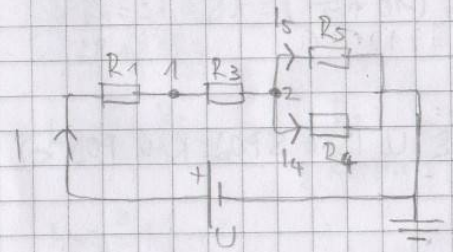
$U = U_{R1} + U_{R2}$

$U = 80V$

$U_{R2} = \varphi_1 - 0$

$\varphi_1 = +30V$

AKO ODSPOJIMO R_2 IMAMO OVO



$R_{UK} = R_1 + R_3 + (R_4 \| R_5) = 25\Omega$

$I = \frac{U}{R_{UK}} = 3.2A$

$I_4 = I_5 = 1.6A$

$U_{R4} = I_4 R_4 = 16V = U_{R5}$

$U_{R4} = \varphi_2 - 0$

$\varphi_2 = +16V$

2-11.

$I_2 = ?$

$U = ?$

$R_1 = 6\Omega$

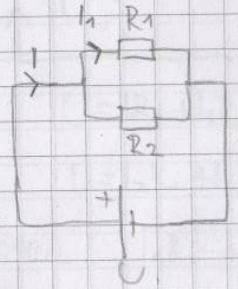
$R_2 = 3\Omega$

$R_3 = 8\Omega$

$R_4 = 8\Omega$

$I_1 = 1A$

OTPORI R_3 I R_4 SU KRATKO STOJENI TAKO DA IMAMO



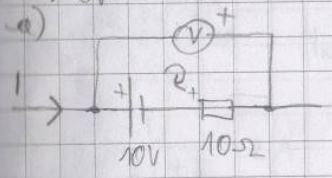
$U_1 = U_2 = U = I_1 R_1 = 6V$

$R_{UK} = \frac{R_1 R_2}{R_1 + R_2} = 2\Omega$

$I = \frac{U}{R_{UK}} = 3A$

2-12. $U_V = 20$ zb.

a)

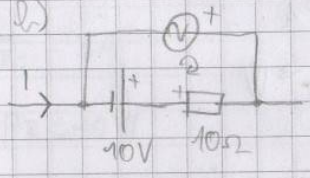


$1 \cdot 10 + 10 + 20 = 0$

$10I = -30$

$I = -3A$

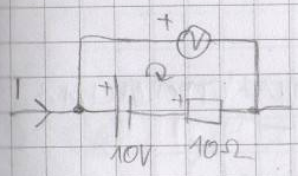
b)



$1 \cdot 10 - 10 + 20 = 0$

$10I = -10$

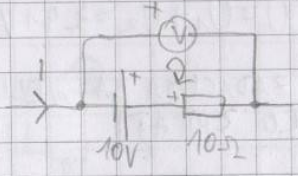
$I = -1A$



$1 \cdot 10 + 10 - 20 = 0$

$10I = 10$

$I = 1A$



$1 \cdot 10 - 10V - 20V = 0$

$10I = 30$

$I = 3A$

2-13.

$I = 2A$

$R_1 = 1A/V$

$R_2 = 1V/A^2$

$U_1 = \frac{I}{R_1} = \frac{2A}{1\frac{A}{V}} = 2V$

$U_2 = R_2 I^2 = 1\frac{V}{A^2} \cdot 4A^2 = 4V$

$U = U_1 + U_2 = 6V$

2-14.

$U = 4V$
$I = ?$

$I = I_1 + I_2 = k_1 U + \sqrt{\frac{U}{k_2}} = 6A$

2-15.

$I = kU^2$
$k = 0.1\ mA/V^2 = 1 \cdot 10^{-4} A/V^2$
$R = 2000\Omega$
$U = 2.5V$
$I = ?$
$P = ?$

$I_1 = kU^2 = 6.25 \cdot 10^{-4} A$

$I_2 = \frac{U}{R} = 1.25 \cdot 10^{-3} A$

$I = I_1 + I_2 = 1.875 \cdot 10^{-3} A$

$P = UI = 4.6875 \cdot 10^{-3} W$

2-16.

$U = kI^{0.5} = k\sqrt{I}$
$k = 1\ V/A^{0.5}$
$R = 1\Omega$
$I = 2A$
$U = ?$

$U_1 = k\sqrt{I} = 1.41V$

$U_2 = IR = 2A$

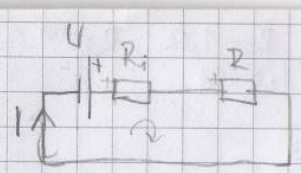
$U = U_1 + U_2 = 3.41V$

GRAFOVE U OVIM ZADACIMA SA NELINEARNIM OTPORNICIMA MI SE NIJE DALO CRTATI

III.1

1-1.

$R_1 = 10\Omega$
$I_1 = 1A$
$R_i = 2.5\Omega$
$I_2 = 2A$
a) $I_{KS} = ?$
b) $U_{PH} = ?$
c) $R_i = ?$
d) $P = ?$ $R = 2.5, 5, 10\Omega$



$U = I_1 R_i + I_1 R_1$

$U = I_2 R_i + I_2 R_2$

$I_1 R_i - I_2 R_i = I_2 R_2 - I_1 R_1$

$R_i = \frac{I_2 R_2 - I_1 R_1}{I_1 - I_2} = 5\Omega$

$U = I_1 R_i + I_1 R_1$
$U = 15V = U_{PH}$

$I_{KS} = \frac{U}{R_i} = 3A$

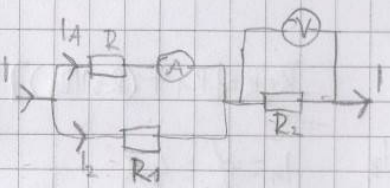
d) $I_1 = \frac{U}{R_i + R} = 2A$ $P_1 = I^2 R = 10W$

$I_2 = 1.5A$ $P_2 = 11.25W$

$I_2 = 1A$ $P_3 = 10W$

1-3.

$I_A = 2A$
$U_V = 18V$
a) $R = ?$
b) $I = ?$
c) $P = ?$



$R_1 = R_2 = 3\Omega$ $I = \frac{U_V}{R_2} = 6A$

$R_{UK} = (R \| R_1) + R_2 = 5\Omega$

$P = I^2 R_{UK} = 180W$

$I = I_A + I_2$
$I_2 = 4A$

$U_{R1} = U_R = I_2 R_1 = 12V$

$R = \frac{U_R}{I_A} = 6\Omega$