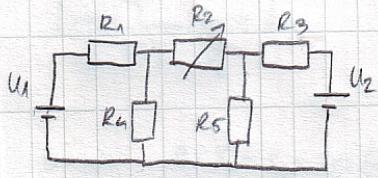


3) D10 - D2



Thevenin \Rightarrow 1.) Odspojimo element za koji tražimo podatak (R_2)

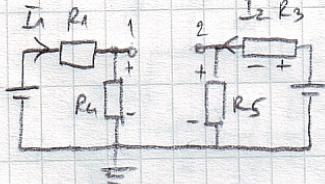
2.) Napon između točaka odspajanja (bito tajom metodom)

3.) Ispitujemo sve izvore (kratki spoj i odspojamo)

$$R_1 = 5\Omega \quad R_4 = 5\Omega$$

$$R_3 = 6\Omega \quad R_5 = 5\Omega$$

4.) Nadomesni izvor



$$12) \quad I_1 = \frac{U_1}{R_1 + R_4} = \frac{10}{5+5} = 1A$$

$$I_2 = \frac{U_2}{R_3 + R_5} = \frac{7}{11} A$$

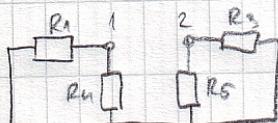
$U_{12} \rightarrow$ od 2. \rightarrow 1. bito tajim putem



$$= -\frac{7}{11} \cdot 5 + 1 \cdot 5 = 5 - \frac{35}{11} = 1,82$$

$$= -I_2 R_5 + I_1 R_4$$

3.)

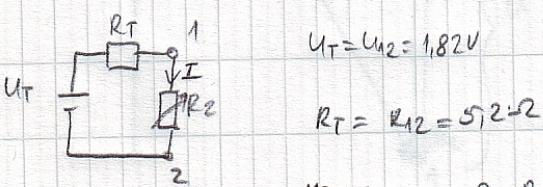


$$R_{12} = ?$$

$$R_{12} = R_3 \parallel R_5 + R_1 \parallel R_4$$

$$\begin{aligned} &= \frac{R_3 R_5}{R_3 + R_5} + \frac{R_1 R_4}{R_1 + R_4} = \frac{6 \cdot 5}{6+5} + \frac{5 \cdot 5}{5+5} \\ &= \frac{30}{11} + \frac{25}{10} = 2,72 + 2,5 = \underline{\underline{5,227 \Omega}} \end{aligned}$$

4.)



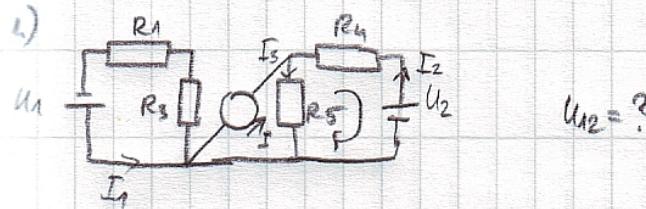
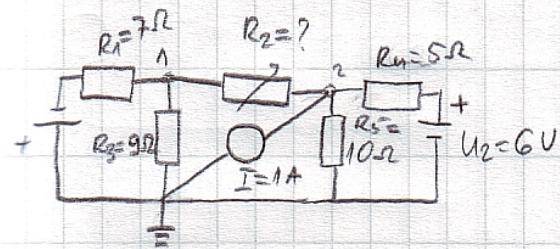
$$U_T = U_{12} = 1,82V$$

$$R_T = R_{12} = 5,227 \Omega$$

Max snaga $\rightarrow R_2 = R_T$

$$R_T = 5,227 \Omega \rightarrow I = \frac{U_T}{R_T + R_2} = \frac{1,82}{10,4} \Rightarrow P = I^2 \cdot R_2 =$$

$$\frac{U^2}{R_T} \rightarrow \frac{(U)^2}{R_T}$$



$$I_1 = \frac{U_1}{R_1 + R_2} = \frac{8}{16} = 0,5 \text{ A}$$

KZN, KZS

$$R_5 I_3 + I_2 R_4 - U_2 = 0$$

$$I + I_2 = I_3$$

$$R_5 (I + I_2) + I_2 R_4 = U_2$$

$$I_2 (R_4 + R_5) = U_2 - I \cdot R_5$$

$$I_2 = \frac{U_2 - I \cdot R_5}{R_4 + R_5} = \frac{6 - 0,5 \cdot 9}{15} = \frac{4}{15} = 0,267 \text{ A}$$

$U_{12} \rightarrow$ od 2 preko U_2

$$U_{12} = I_2 \cdot R_4 - U_2 - I_1 R_3$$

$$U_{12} = \frac{4}{15} \cdot 5 - 6 - 0,5 \cdot 9$$

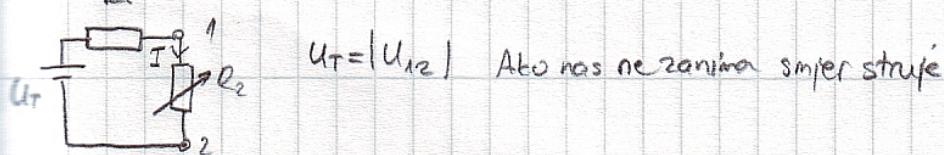
$$= -\frac{2}{3} - 6 - 4,5$$

$$= -11,83 \text{ V}$$

3) $R_{12} = R_4 / R_5 + R_3 / R_4 = 7,27 \Omega$



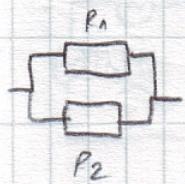
4)



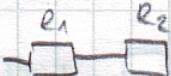
$$R_T = R_{12}$$

1.) ISTOŠNIJE RENA STRUJA

Vježbe: U paralelnim pojavi snage ne na R_1 i R_2 odnosi 1:2. koika je odnose struja na njih?



$$\frac{P_1}{P_2} = \frac{1}{2}$$



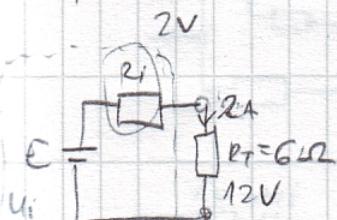
$$P = U \cdot I = I^2 \cdot R = \frac{U^2}{R}$$

$$\frac{\frac{U^2}{R_1}}{\frac{U^2}{R_2}} = \frac{1}{2}$$

$$\frac{R_2}{R_1} = \frac{2}{1}$$

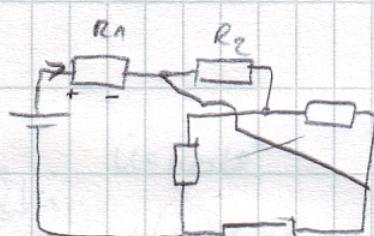
$$\frac{P_1}{P_2} = \frac{I^2 \cdot R_1}{I^2 \cdot R_2} = \frac{I^2 R_1}{I^2 R_2} = \frac{R_1}{R_2} = 2$$

⑤ $U_{PH} = 14V$



$$R_I = 1\Omega$$

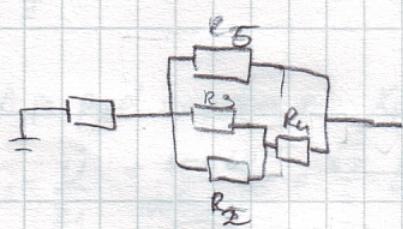
⑥ $I_{R_{22}} = ?$



Gledaj u gđe ide struja

$$R = 1\Omega$$

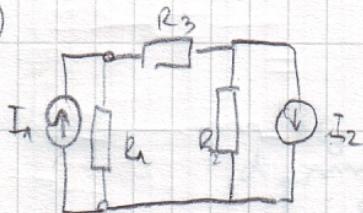
$$U = 2V$$



$$R_{23} = \frac{R_2 \cdot R_3}{R_2 + R_3} = 0,5\Omega$$

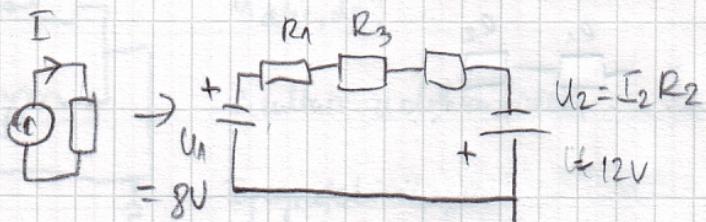
$$I_{R_{23}} = 1,5A$$

8.



$$P_{R2} = ?$$

Strujni → paralelni → na + u seriji
tj. gledaju se prema stranama trijedice nizom

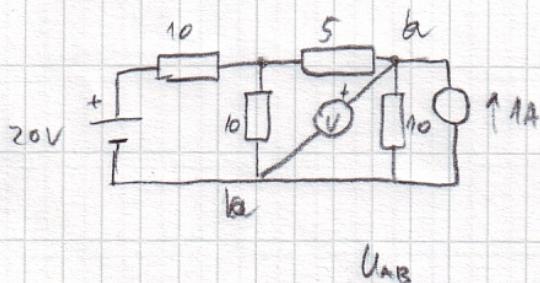


$$U_1 = I_1 \cdot R_1 = 8V$$

$$I = \frac{U_1 + U_2}{R_1 + R_2 + R_3}$$

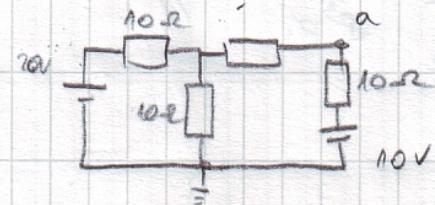
$$P = I^2 \cdot R_2 = 6W$$

g)



$$U_V = 10V$$

trans
strujni u regonete
→



$$\begin{aligned} U_A &= \frac{\frac{20}{10} + \frac{10}{10+5}}{\frac{1}{10} + \frac{1}{10} + \frac{1}{15}} \\ &= 10V \end{aligned}$$

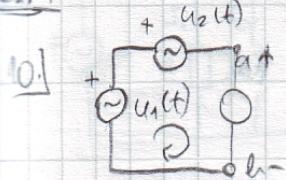
$$10 = 10e^{j\omega t} \cdot 10 \cdot I_2 + I_2 \cdot 5$$

$$I_2 = 0$$

$$U_{AB} = 0 + 10V = 10V$$

③ 12M/EN/CNA STRU↑

2.MI



$$U_1(t) = 10 \sin \omega t [V]$$

$$U_2(t) = 10 \cos \omega t [V]$$

$$U_1 = \frac{10}{\sqrt{2}} \angle 0^\circ$$

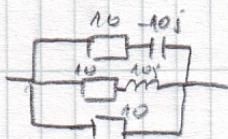
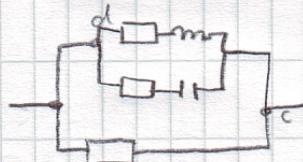
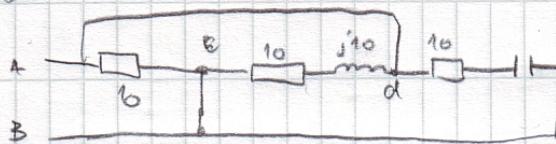
$$U_2(t) = 10 \sin(\omega t + \frac{\pi}{2}) = 10\sqrt{2} \angle 90^\circ$$

$$U_1(t) - U_2(t) - U_{AB} = 0$$

$$U_{AB} = U_1(t) - U_2(t)$$

$$= 10$$

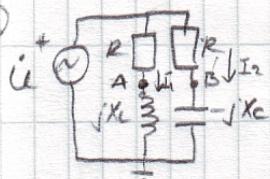
4.) $Z_{AB} = ?$



$$\frac{1}{Z_{AB}} = \frac{1}{1} + \frac{1}{1+j1} + \frac{1}{1-j1}$$

$$Z_{AB} = 5 \Omega$$

③



$$U = 100 \angle 0^\circ$$

$$R = X_L = X_C = 100 \Omega$$

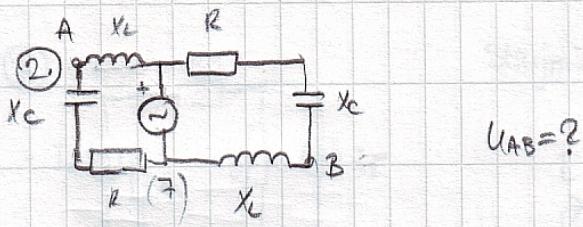
A je pad napona na X_L a ne na R !

$$I_A = \frac{U}{Z_1} = \frac{100 \angle 0^\circ}{100\sqrt{2} \angle 45^\circ} = \frac{\sqrt{2}}{2} \angle -45^\circ$$

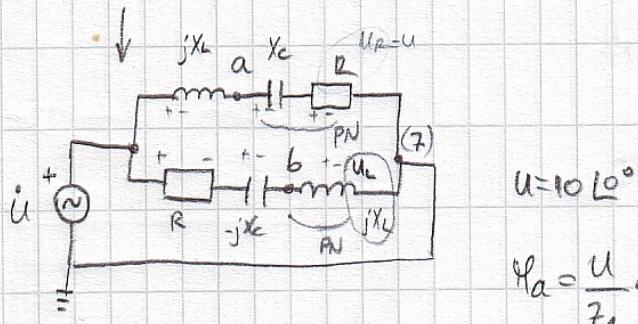
$$Z_1 = 100 + 100j = 100\sqrt{2} \angle 45^\circ$$

$$\varphi_A = \frac{\sqrt{2}}{2} \angle -45^\circ + 100 \angle 90^\circ = 50\sqrt{2} \angle 45^\circ \Rightarrow \varphi_b$$

D) $100 \angle 90^\circ$



$$U = 10V \quad R = X_L = X_C = 10\Omega$$



$$\varphi_a = \frac{U}{Z_1} \cdot Z_{11} = \frac{10 \angle 0^\circ}{R \angle 0^\circ} \cdot R \sqrt{2} \angle 45^\circ = 10\sqrt{2} \angle 45^\circ$$

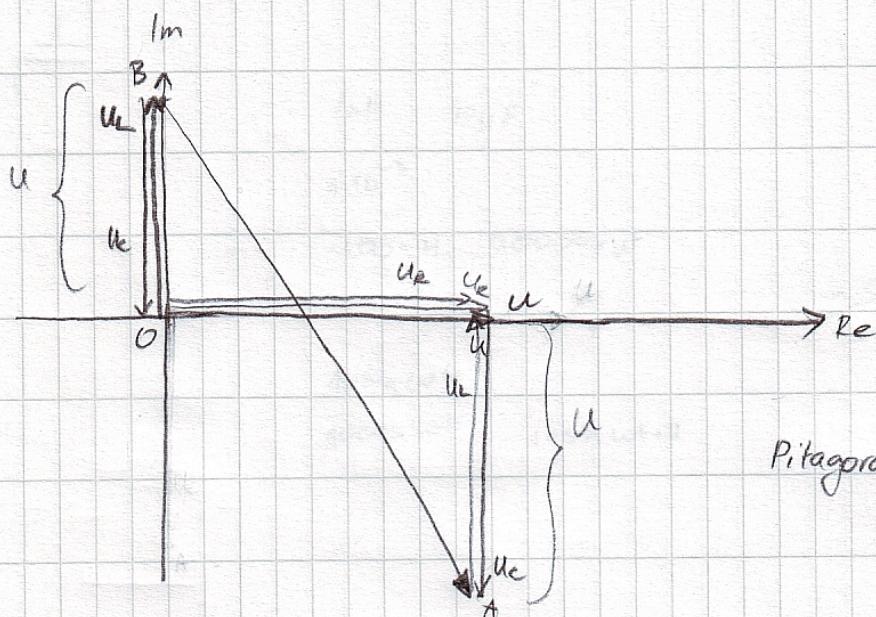
$$Z_1 = -jX_C + jX_L + R = R \angle 0^\circ$$

$$Z_{11} = R - jX_C = R\sqrt{2} \angle -45^\circ$$

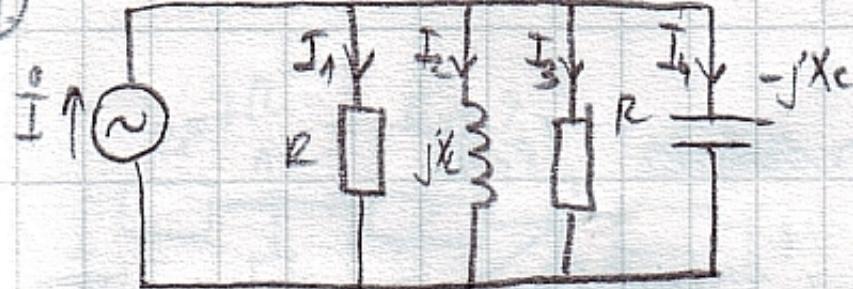
$$\begin{aligned}\varphi_b &= \frac{10 \angle 0^\circ}{R \angle 0^\circ} \cdot R \angle 90^\circ \\ &= 10 \angle 90^\circ\end{aligned}$$

$$\begin{aligned}\varphi_a - \varphi_b &= U_{AB} = (10 - 10j) - 10j \\ &= \underline{10 - 20j}\end{aligned}$$

DIAGRAM:



①



$$I_1 = 1A$$

$$I_2 = 8A$$

$$I_3 = 3A$$

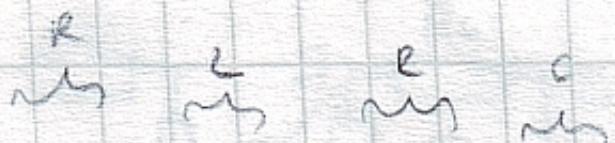
$$I_4 = 5A$$

$$U \angle 0^\circ$$

$$X_L \angle -90^\circ$$

$$X_L \angle 90^\circ$$

ef. vrijednost strujnog izvora = ?



$$1+0j + 0-8j + 3+0j + 0+5j = 4-3j$$

$$|Z| = \sqrt{3^2 + 4^2} = 5$$