PROVJERA ZNANJA 2016. LJETO

(10.) $R = X_C = 100\,\Omega$

$A = I_1 + I_2 + I_3 = 2\sqrt{2}$

$\boxed{I = I_0 \angle \varphi}$

$$\frac{U\angle 0}{-j100} + \frac{U\angle -120}{100} + \frac{U\angle -240}{100} = 2\sqrt{2}\angle\varphi$$

$$U\left(\frac{1\angle 0}{-j100} + \frac{1\angle -120}{100} + \frac{1\angle 240}{100}\right) = 2\sqrt{2}\angle\varphi \quad / : \left(\frac{1\angle 0}{-j100} + \dots\right)$$

D) $U = 200\ V$

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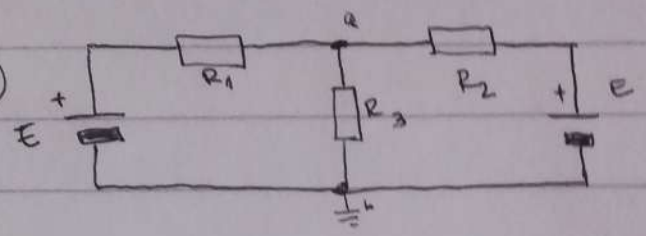
9.



$R_1 = R_2 = R_3 = R$

$U_{R_3} = ?$

Millmanova metoda:

$$U_{ab} = \frac{\frac{E}{R_1} + \frac{E}{R_2}}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_2}}$$

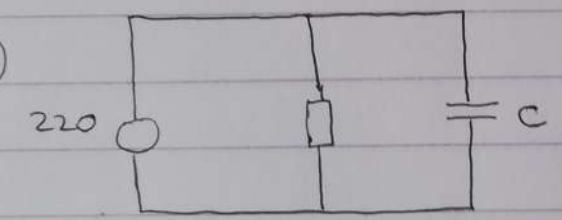
U brojnik ide struje, a U nazivnik vodljivost

$R_1 = R_2 = R_3 = R$

$$U_{ab} = \frac{\frac{E}{R} + \frac{E}{R}}{\frac{1}{R} + \frac{1}{R} + \frac{1}{R}} = \frac{\frac{2E}{R}}{\frac{3}{R}} = \frac{2E}{3} = 0,667\,E$$

B) 0,667E

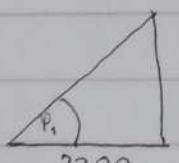
10.



$\cos\varphi_1 = 0,866 \rightarrow \varphi_1 = 30°$

$\cos\varphi_2 = 1 \rightarrow \varphi_2 = 0°$

$P = \frac{U^2}{R} = \frac{220^2}{22} = 2200\,W$



$tg\,\varphi_1 = \frac{Q_1}{P} \Rightarrow Q_1 = 1270\,VAr$

$Q_2 = tg\,\varphi_2 \cdot P$

$Q_2 = 0$

$Q_C = Q_1 - Q_2$

$Q_C = 1270\,VAr \rightarrow X_C = \frac{U^2}{Q_C} = \frac{220^2}{1270} = 38,1\,\Omega$

$X_C = \frac{1}{C\omega} \Rightarrow C = \frac{1}{X_C \omega} = \frac{1}{38,1 \cdot 2\pi \cdot f} = \frac{1}{38,1 \cdot 2\pi \cdot 50} = 83,54\,\mu F$

B) $C = 83,54\,\mu F$

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(9.) Isti postupak kao i PZ 2019.

d) $11{,}2\ \Omega$

(10.) Isti postupak kao i PZ 2019.

e) $Z_T = 5 - j\frac{5}{3}$, $E_T = \frac{50}{3}\angle 30$

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(9.)

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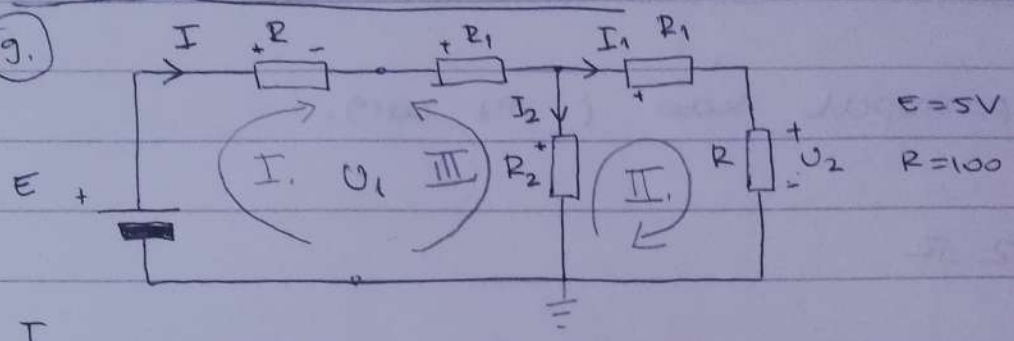
9.



I.

$5 - I \cdot R = 3$

$-IR = 3 - 5$

$-100I = -2$

$I = 0.02\,A = 20\,mA$

$I_1 = \frac{U_2}{R_2} = \frac{1}{100} = 0.01\,A$

$I_2 = I - I_1 = 0.01$

II. $I_2 \cdot R_2 - I_1 \cdot R_1 - U_2 = 0$

III. $I_2 \cdot R_2 + I \cdot R_1 = 3 \quad / \cdot (-1)$

$-I_1 \cdot R_1 - U_2 - I \cdot R_1 = -3$

$R_1 (-I_1 - I) = -2$

$R_1 (-0.03) = -2$

$R_1 = 66\frac{2}{3} = 66.67\,\Omega$

$I_2 \cdot R_2 = U_2 + I_1 \cdot R_1$

$R_2 = \frac{U_2 + I \cdot R_1}{I_2}$

$R_2 = \frac{1 + 0.03 \cdot 66.67}{0.01}$

$R_2 = 166.67\,\Omega$

$\boxed{\frac{R_2}{R_1} = \frac{166.67}{66.67} = 2.5}$

10. $Z_1 = Z_2 = Z_3 = 60\angle 60$

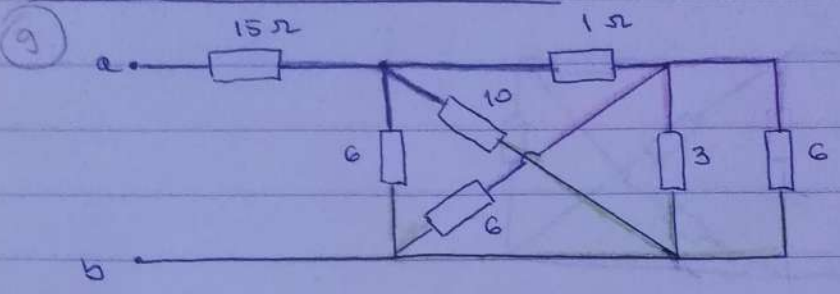
TROKUT $\Rightarrow \boxed{U_L = U_F}$!

$P_{uk} = 3 \cdot P = 3 \cdot \frac{U^2}{Z} \cdot \cos(\varphi) = 3 \cdot \frac{380^2}{100} \cdot \cos(60)$

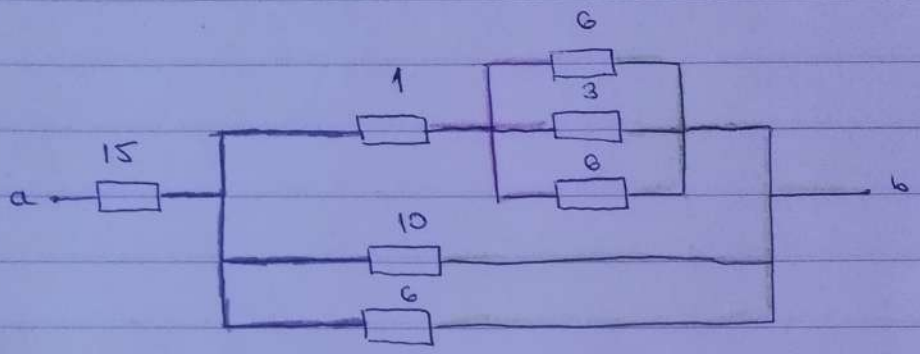
$\boxed{P_{uk} = 2166 = 2{,}166\,kW}$

PROVJERA ZNANJA 2019.

9)



Nova shema:



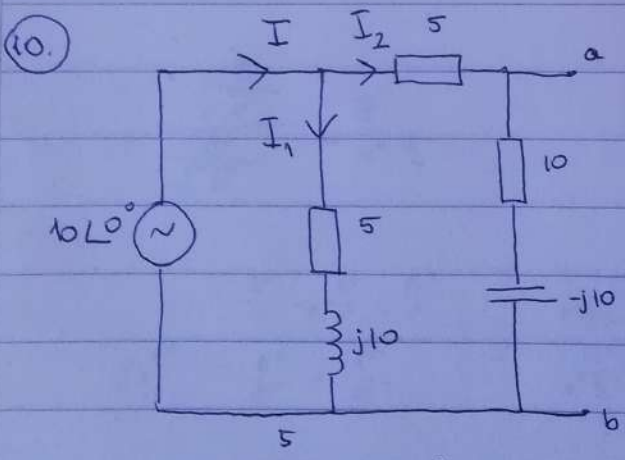
$R_{uk} = 15 + ((1 + 6 \| 3 \| 6) \| 10 \| 6)$

$= 15 + (2.5 \| 10 \| 6)$

$= 15 + 1.5$

$= 16.5\,\Omega$

10.



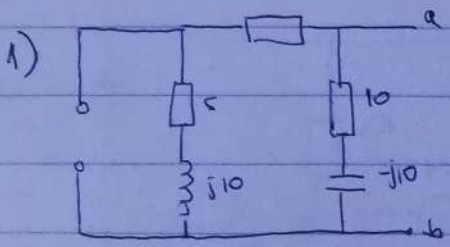
1) $Z_T = ?$

Makni izvor

strujni izvor → prazan hod

naponski izvor → kratki spoj

1)



$Z_T = (5+5+j10) \| (10-j10)$

$Z_T = 10\,\Omega$

2) vrati izvor, izračunaj struju I_2

$I_2 = I \cdot \frac{5+j10}{5+j10+5+10-j10} = 2.5+5i$

$U_{ab} = I_2 \cdot (10-j10) = 75+25j$