

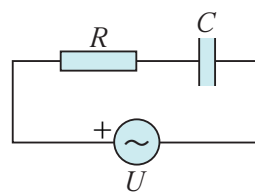
Profesorov prvi postulat: "Što se ne može pročitati, ne može se ni ocijeniti."

Ime i prezime _____

Broj indeksa _____

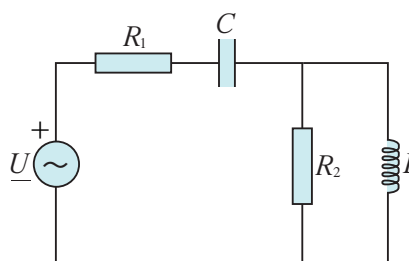
1. Trošilo prikazano na slici sastoji se od otpornika i idealnog kondenzatora, te ima faktor snage koji iznosi $\cos \varphi_1 = 0,5$. Potrebno je odrediti faktor snage trošila, ako se frekvencija sinusnog napona priključenog na trošilo smanji tri puta.

A	$\cos \varphi_2 = 0,189$	B	$\cos \varphi_2 = 0,866$
C	$\cos \varphi_2 = 0,500$	D	$\cos \varphi_2 = 0,939$
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		



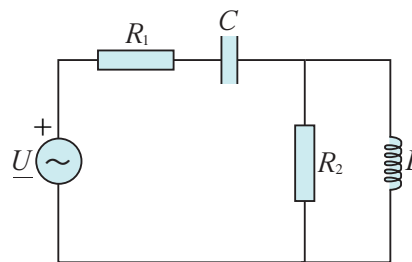
2. Za krug prikazan na slici potrebno je odrediti reaktivnu otpornost zavojnice tako da u kolu nastupi naponska rezonansa. Poznato je: $R_1 = 2 (\Omega)$; $R_2 = 5 (\Omega)$; $X_C = 2 (\Omega)$.

A	$X_{L1} = 5,21 (\Omega)$ $X_{L2} = 19,79 (\Omega)$	B	$X_{L1} = 8,75 (\Omega)$ $X_{L2} = 16,25 (\Omega)$
C	$X_{L1} = 0,4 (\Omega)$ $X_{L2} = 12 (\Omega)$	D	$X_{L1} = 2,5 (\Omega)$ $X_{L2} = 10 (\Omega)$
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		



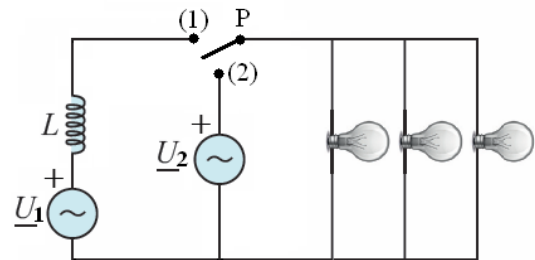
3. Za krug prikazan na slici odredite pri kojem odnosu otpornosti R_2 i reaktivne otpornosti X_C se promjenom reaktivne otpornosti X_L ne može postići naponska rezonansa.

A	$-2X_C \leq R_2 \leq 2X_C$	B	$R_2 \leq 2X_C$
C	$R_2 \geq 2X_C$	D	$R_2 \rightarrow \infty$
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		



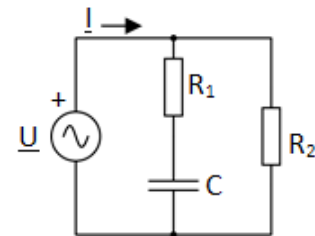
4. Odredite vrijednost induktiviteta zavojnice tako da svaka žarulja/sijalica/sijalica troši po $P = 50$ (W) neovisno/ nezavisno/nezavisno od položaja u kojem se nalazi prekidač **P**. Poznato je: $U_1 = 220$ (V); $U_2 = 127$ (V); $f = 50$ (Hz).

A	$L = 1,026$ (H)	B	$L = 0,593$ (H)
C	$L = 2,149$ (H)	D	$L = 0,484$ (H)
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		



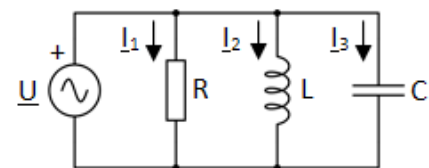
5. U električnom krugu prikazanom na slici, otpornost R_2 se povećava. Fazni pomak između referentnog fazora napona izvora \underline{U} i fazora struje \underline{I} pri tome:

A	se prvo povećava, a zatim se smanjuje.	B	se povećava.
C	ostaje nepromijenjen.	D	se smanjuje.
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		



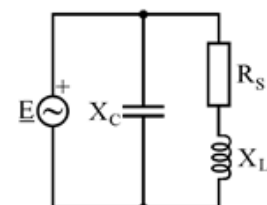
6. Odrediti reaktivnu snagu izvora. Poznato je: $I_1 = 2$ (A); $I_2 = I_3 = 6$ (A); $\underline{U} = 100$ (V).

A	$Q = 1200$ (VAr)	B	$Q = 600$ (VAr)
C	$Q = 200$ (VAr)	D	$Q = 16,67$ (VAr)
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		



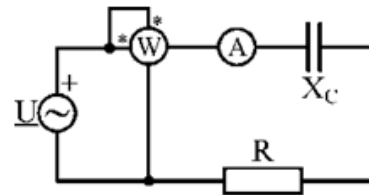
7. Električni krug sa slike, pri nekim vrijednostima L , C , R_s , se nalazi u stanju strujne rezonanse. Ako se R_s i L smanje dva puta, a C poveća dva puta, kako se mijenja rezonantna frekvencije pri ovakvim promjenama?

A	Ne mijenja se.	B	Povećava se dva puta.
C	Smanji se dva puta.	D	Smanji se četiri puta.
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		



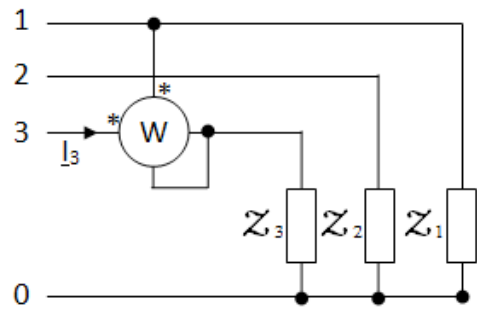
8. U električnom krugu prikazanom na slici odrediti reaktansu kondenzatora X_C ako je poznato: $\underline{U} = 200$ (V); $P_W = 640$ (W); $I_A = 4$ (A). Mjerni instrumenti mogu se smatrati idealnim.

A	$X_C = 30$ (Ω)	B	$X_C = 50$ (Ω)
C	$X_C = 40$ (Ω)	D	$X_C = 10$ (Ω)
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		



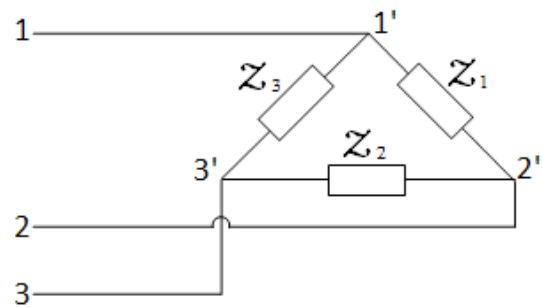
9. Trofazno trošilo sa slike je priključeno na trofaznu simetričnu mrežu direktnog redoslijeda faznih napona. Odredite pokazivanje idealnog vatmetra. Poznato je: $\underline{U}_{10} = 115,5e^{j0^\circ}$ (V); $Z_1 = 14e^{j90^\circ}$ (Ω); $Z_2 = 28,8e^{j30^\circ}$ (Ω); $Z_3 = -23,1e^{j150^\circ}$ (Ω)

A	$P_W = 1000$ (W)	B	$P_W = -1000$ (W)
C	$P_W = 800$ (W)	D	$P_W = -800$ (W)
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		



10. Na trofaznu simetričnu mrežu direktnog redoslijeda faznih napona priključeno je trošilo spojeno u trokut sa impedansama faza: $Z_1 = 12e^{j0^\circ}$ (Ω); $Z_2 = 10e^{-j45^\circ}$ (Ω); $Z_3 = 12e^{j60^\circ}$ (Ω) kao na slici. Potrebno je odrediti fazne struje potrošača ako je poznato $U_L = 240$ (V).

A	$\underline{I}_{12} = 20e^{j30^\circ}$ (A) $\underline{I}_{23'} = 24e^{-j45^\circ}$ (A) $\underline{I}_{3'1'} = 20e^{j90^\circ}$ (A)	B	$\underline{I}_{12} = 20e^{j0^\circ}$ (A) $\underline{I}_{2'3} = 24e^{j105^\circ}$ (A) $\underline{I}_{3'1'} = 20e^{j120^\circ}$ (A)
C	$\underline{I}_{12} = 20e^{j180^\circ}$ (A) $\underline{I}_{2'3'} = 24e^{j15^\circ}$ (A) $\underline{I}_{3'1'} = 20e^{j0^\circ}$ (A)	D	$\underline{I}_{1'2'} = 20e^{-j180^\circ}$ (A) $\underline{I}_{2'3} = 24e^{j255^\circ}$ (A) $\underline{I}_{3'1'} = 20e^{j120^\circ}$ (A)



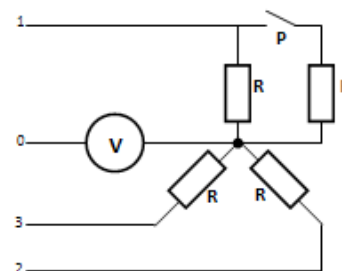
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		
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11. Posmatra se simetričan trofazni generator napona za koji je poznat fazor faznog napona $\underline{U}_{10} = 100e^{j0^\circ}$ (V). Koliko iznosi promjena ($\underline{U}_{pocetno} - \underline{U}_{krajnje}$) faznog stava linijskog napona \underline{U}_{12} pri promjeni redoslijeda faznih napona sa direktne raspodjele na inverznu raspodjelu.

A	-30°	B	30°	C	60°	D	-60°
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:						

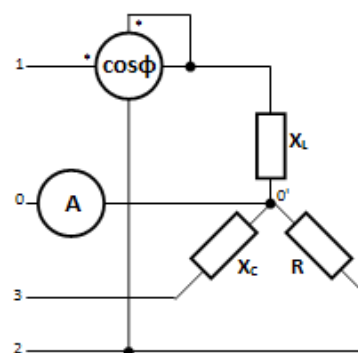
12. Trofazno trošilo spojeno je u zvijezdu kao na slici, te je spojeno na simetričnu trofaznu mrežu inverznog redoslijeda faznih napona, pri čemu efektivna vrijednost faznog napona generatora iznosi $U_F = 220$ (V). Odrediti prirast pokazivanja idealnog instrumenta na slici ukoliko se zatvori prekidač P.

A	$\Delta U = 22$ (V)	B	$\Delta U = 0$ (V)
C	$\Delta U = 40$ (V)	D	$\Delta U = 55$ (V)
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		



13. Trofazno trošilo spojeno je u zvijezdu kao na slici, te je spojeno na simetrični trofazni generator inverznog redoslijeda linijskih napona $U_L = 346$ (V). Odrediti pokazivanja idealnih instrumenata na slici. Poznato je $R = 4$ (Ω); $X_L = 20$ (Ω); $X_C = 10$ (Ω).

13.1			
A	$\cos \varphi = 1$	B	$\cos \varphi = 0,866$
C	$\cos \varphi = 0$	D	$\cos \varphi = 0,5$
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		



13.2			
A	$I_A = 8,5$ (A)	B	$I_A = 80$ (A)
C	$I_A = 24,6$ (A)	D	$I_A = 6$ (A)
E	Niti jedan od prethodno ponuđenih odgovora nije tačan. Tačan odgovor je:		

GRUPA A

Zadatak	Popunjava student		
	Upisati tačan odgovor	Broj bodova	Ostvareni broj bodova
1.		1	
2.		1	
3.		2	
4.		2	
5.		2	
6.		1	
7.		2	

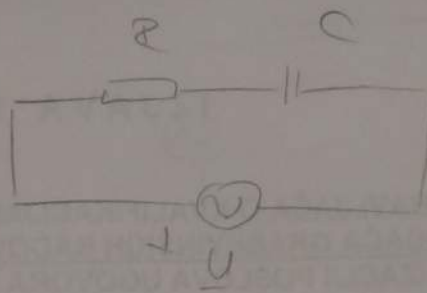
Zadatak	Popunjava student		
	Upisati tačan odgovor	Broj bodova	Ostvareni broj bodova
8.		1	
9.		2	
10.		1	
11.		1	
12.		2	
13.1		1	
13.2		1	

1)

$$\cos \varphi_1 = 0,5$$

$$f_2 = \frac{f_1}{3}$$

$$\cos \varphi_2 = ?$$



$$\varphi_1 = 60^\circ$$

$$\underline{Z} = R - jX_c$$

$$\varphi_1 = \arctg \frac{-X_c}{R}$$

$$\operatorname{tg} \varphi_1 = \frac{-X_c}{R} = \frac{-\frac{1}{2\pi f_1 C}}{R} = \frac{-1}{2\pi f_1 R C}$$

$$\sqrt{3} = \frac{-1}{2\pi f_1 R C} \quad (*)$$

$$\Rightarrow \operatorname{tg} \varphi_2 = \frac{-1}{2\pi \frac{f_1}{3} R C} = \frac{-3}{2\pi f_1 R C} \quad \sqrt{3}$$

$$\operatorname{tg} \varphi_2 = -3\sqrt{3}$$

$$\varphi_2 = \arctg(-3\sqrt{3}) = -79,1^\circ$$

$$\cos \varphi = 0,189$$

 \Rightarrow
 $\textcircled{A} \checkmark$

2.)

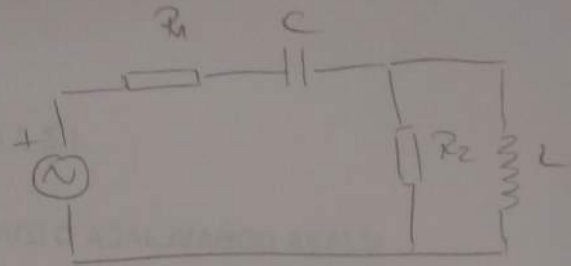
naponska rezonansa

$$R_1 = 2 \Omega$$

$$R_2 = 5 \Omega$$

$$X_C = 2 \Omega$$

$$X_L = ?$$



$$\underline{Y} = \underline{Y}_1 + \underline{Y}_2$$

$$\underline{Y}_1 = R_1 - j X_C$$

$$\underline{Y}_2 = \frac{R_2 + j X_L}{R_2 - j X_C} \cdot \frac{R_2 - j X_C}{R_2 + j X_L} = \frac{R_2 X_L^2 + j R_2^2 X_L}{R_2^2 + X_L^2}$$

$$\underline{Y} = R_1 + \frac{R_2 X_L^2}{R_2^2 + X_L^2} - j \left(X_C - \frac{R_2^2 X_L}{R_2^2 + X_L^2} \right)$$

$$X_C = \frac{R_2^2 X_L}{R_2^2 + X_L^2}$$

$$R_2^2 X_C + X_L^2 X_C = R_2^2 X_L$$

$$2 X_L^2 - 25 X_L + 50 = 0 \quad | :2$$

$$X_L^2 - 12,5 X_L + 25 = 0$$

$$X_{L1,2} = \frac{12,5 \pm 4,5}{2}$$

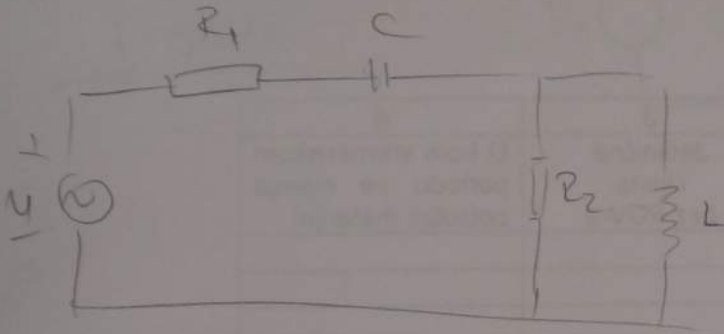
$$X_{L1} = 10 \Omega$$

$$X_{L2} = 2,5 \Omega$$

 $\Rightarrow \textcircled{D} \omega$

3.)

$$\underline{Z} = R_1 + \frac{R_2 X_L^2}{R_2^2 + X_L^2} - j \left(X_C - \frac{R_2^2 X_L}{R_2^2 + X_L^2} \right)$$



$$X_C = \frac{R_2^2 X_L}{R_2^2 + X_L^2}$$

$$R_2^2 X_C + X_L^2 X_C - R_2^2 X_L = 0$$

$$X_L^2 X_C - R_2^2 X_L + R_2^2 X_C = 0$$

$$D = R_2^4 X_L^2 - 4 X_L^2 X_C^2 R_2^2 < 0$$

$$R_2^4 X_L^2 < 4 X_L^2 X_C^2 R_2^2 \quad | \sqrt{\quad}$$

$$R_2^2 X_L < 2 X_C R_2 \quad | : R_2 X_L$$

$$\boxed{R_2 \leq 2 X_C} \Rightarrow \textcircled{3} \text{ w}$$

4.)

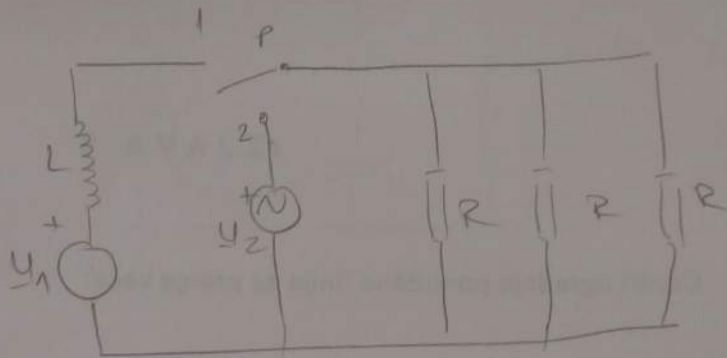
$$P = 50W$$

$$U_1 = 220V$$

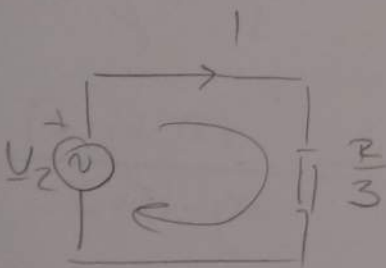
$$U_2 = 127V$$

$$f = 50Hz$$

$$L = ?$$



2°

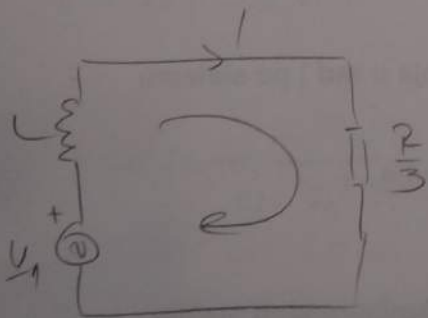


$$3P = \frac{U_2^2}{\frac{R}{3}} = \frac{3U_2^2}{R}$$

$$3P = \frac{3U_2^2}{R} \Rightarrow R = \frac{U_2^2}{P} \Rightarrow$$

$$R = 322,58 \Omega$$

$$I = \frac{U_2}{\frac{R}{3}} = \frac{3U_2}{R} = 1,18A$$



$$\omega = 2\pi f = 314,15 \frac{rad}{s}$$

$$Z = \frac{R}{3} + jX_L$$

$$\Rightarrow Z = \sqrt{\frac{R^2}{9} + X_L^2}$$

$$I = \frac{U_1}{Z} \Rightarrow Z = \frac{U_1}{I} = 186,44$$

$$34759,87 = 11561,98 + X_L^2$$

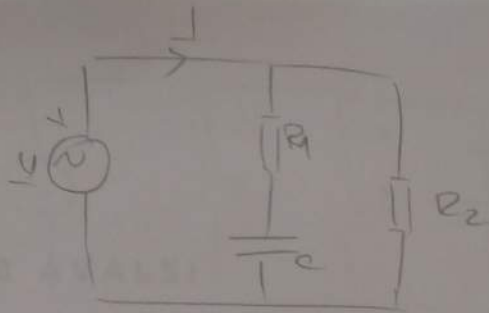
$$X_L = 152,30 \Omega$$

$$X_L = \omega L \Rightarrow \boxed{L = \frac{X_L}{\omega} = 0,484 H} \Rightarrow \text{D}$$

5)

$Z_2 \nearrow$

$\varphi = ?$



$$\underline{I} = \frac{\underline{U} \underline{Y}}{\underline{U} + \underline{Z}}$$

$$\underline{Y}_1 = R_1 - jX_C ; \quad \underline{Z}_2 = R_2 \text{ (VALSI)}$$

$$\underline{I} = \frac{(R_1 - jX_C) R_2}{R_1 + R_2 - jX_C} = \frac{R_2 R_2 - jX_C R_2}{R_1 + R_2 - jX_C} \cdot \frac{R_1 + R_2 + jX_C}{R_1 + R_2 + jX_C} =$$

$$= \frac{R_1 R_2 + R_1 R_2^2 + j R_1 R_2 X_C - j R_2^2 X_C - j R_2^2 X_C + X_C^2 R_2}{(R_1 + R_2)^2 + X_C^2} =$$

$$= \frac{R_1^2 R_2 + R_1 R_2^2 + X_C^2 R_2}{(R_1 + R_2)^2 + X_C^2} - j \frac{R_2^2 X_C}{(R_1 + R_2)^2 + X_C^2}$$

$$\varphi = \arctg \frac{-R_2^2 X_C}{R_1^2 R_2 + R_1 R_2^2 + X_C^2 R_2}$$

1° $R_1 = 1 ; R_2 = 1 ; X_C = 1$

$$\varphi_1 = \arctg \frac{-1}{3} = -18,43^\circ$$

2° $R_1 = 1 ; R_2 = 2 ; X_C = 1$

$$\varphi_2 = \arctg \frac{-4}{8} = -26,56^\circ$$

$\Rightarrow \varphi$ se povećava

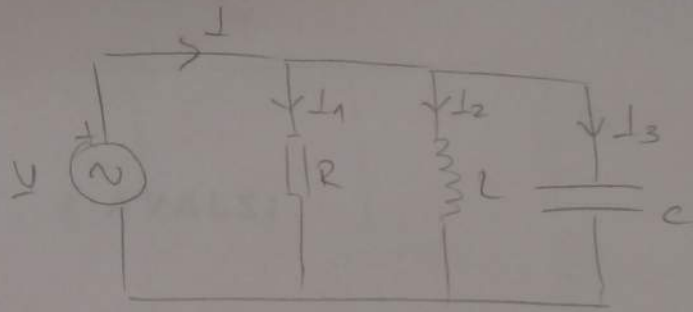
③ W

6.)

$$I_1 = 2 \text{ A}$$

$$I_2 = I_3 = 6 \text{ A}$$

$$U = 100 \text{ (V)}$$



$$Q = ?$$

$$\underline{U} = 100 \cdot e^{j\omega t} \text{ (V)}$$

$$\underline{I}_1 = 2 \cdot e^{j\omega t} = 2$$

$$\underline{I}_2 = 6 \cdot e^{-j\omega t} = -j6$$

$$\underline{I}_3 = 6 \cdot e^{j\omega t} = j6$$

$$\Rightarrow \underline{I} = 2 \text{ (A)}$$

$$\underline{S} = \underline{U} \cdot \underline{I}^* = (100 \cdot 2) = 200 \text{ VA}$$

$$\boxed{Q = 0 \text{ [VAR]}} \Rightarrow \text{Energie}$$

7.) stujna rezonansa

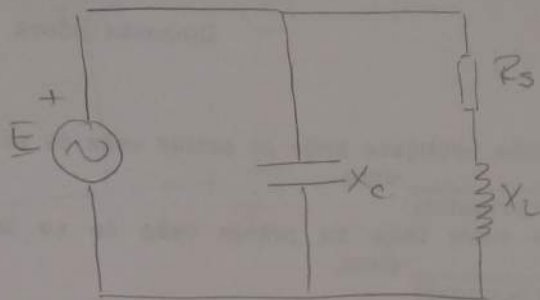
$$L, C, R_s$$

$$L' = \frac{L}{2}$$

$$R_s' = \frac{R_s}{2}$$

$$C' = 2C$$

$$\omega' = ?$$



$$\text{Im}\{Y\} = 0$$

$$Y = Y_1 + Y_2 ; \quad Y_1 = \frac{1}{\frac{1}{j\omega C}} = j\omega C ;$$

$$Y_2 = \frac{1}{R_s + j\omega L} \cdot \frac{R_s - j\omega L}{R_s - j\omega L} = \frac{R_s - j\omega L}{R_s^2 + \omega^2 L^2}$$

$$Y = j\omega C + \frac{R_s - j\omega L}{R_s^2 + \omega^2 L^2} = \frac{R_s}{R_s^2 + \omega^2 L^2} + j \left(\omega C - \frac{\omega L}{R_s^2 + \omega^2 L^2} \right)$$

$$\omega C = \frac{\omega L}{R_s^2 + \omega^2 L^2}$$

$$C R_s^2 + \omega^2 L^2 C = L \Rightarrow$$

$$\omega = \sqrt{\frac{L - C R_s^2}{L^2 C}}$$

$$\omega' = \sqrt{\frac{\frac{L}{2} - C \frac{R_s^2}{2}}{\frac{L^2}{4} \cdot 2C}} = \sqrt{\frac{\frac{L - C R_s^2}{2}}{\frac{L^2 C}{2}}} = \sqrt{\frac{L - C R_s^2}{L^2 C}}$$

\Rightarrow ne mijenja se \Rightarrow (A)

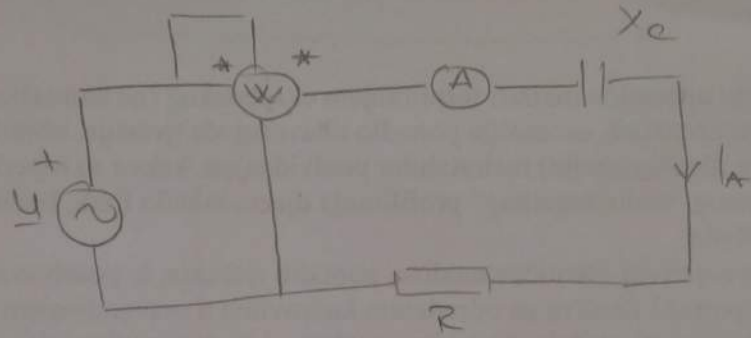
8.)

$$U = 200 \text{ V}$$

$$P_W = 640 \text{ W}$$

$$I_A = 4 \text{ A}$$

$$X_c = ?$$



$$U = 200 \cdot e^{j0^\circ} \text{ V}$$

$$Z = \frac{U}{I_A} = \frac{200}{4} = 50 \Omega$$

$$P_W = I_A^2 \cdot R \Rightarrow R = \frac{P_W}{I_A^2} = 40 \Omega$$

$$Z = R - jX_c \Rightarrow Z = \sqrt{R^2 + X_c^2}$$

$$\sqrt{40^2 + X_c^2} = 50 \quad |^2$$

$$40^2 + X_c^2 = 50^2$$

$$X_c = \sqrt{900} \Rightarrow \boxed{X_c = 30 \Omega}$$

9.)

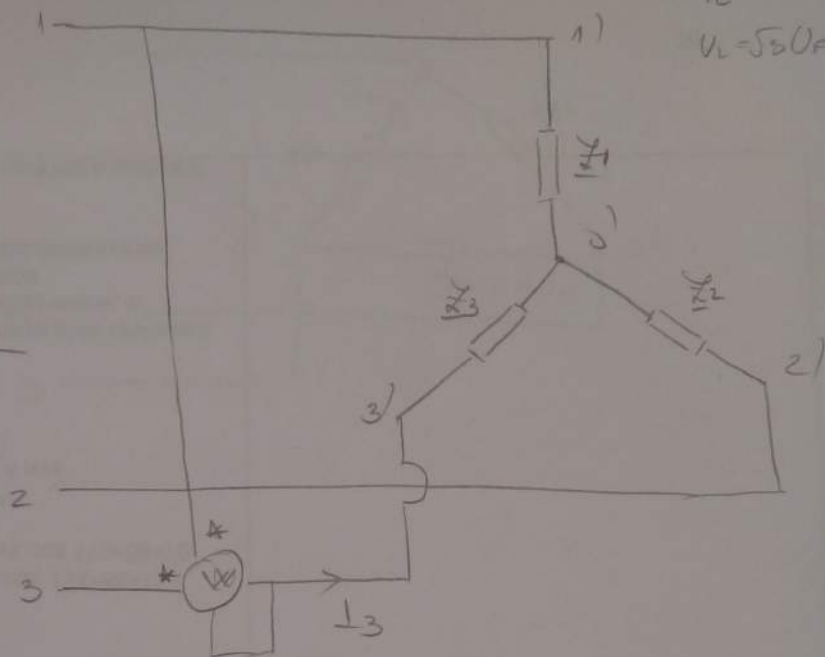
$$\underline{U}_{10} = 115,5 \cdot e^{j10^\circ} \text{ V}$$

$$\underline{Z}_1 = 14 \cdot e^{j0^\circ} \Omega$$

$$\underline{Z}_2 = 28,8 \cdot e^{j30^\circ} \Omega$$

$$\underline{Z}_3 = -23,1 \cdot e^{j150^\circ} \Omega$$

$$P_w = ?$$



$$I_L = I_r$$

$$U_L = \sqrt{3} U_r$$

$$P_w = \operatorname{Re} \{ \underline{U}_{13} \cdot \underline{I}_3^* \}$$

Fazai:

$$\underline{U}_{10} = 115,5 \cdot e^{j10^\circ}$$

$$\underline{U}_{20} = 115,5 \cdot e^{j120^\circ}$$

$$\underline{U}_{30} = 115,5 \cdot e^{j230^\circ}$$

$$\underline{I}_3 = \frac{\underline{U}_{30}}{\underline{Z}_3} = -5 \cdot \frac{e^{j230^\circ}}{e^{j150^\circ}} = -5 \cdot e^{j80^\circ}$$

Linijst:

$$\underline{U}_{12} = 200 \cdot e^{j30^\circ}$$

$$\underline{U}_{23} = 200 \cdot e^{j150^\circ}$$

$$\underline{U}_{31} = 200 \cdot e^{j270^\circ}$$

$$P_w = \operatorname{Re} \{ -200 \cdot e^{j150^\circ} \cdot (-5) \cdot e^{j80^\circ} \} = \operatorname{Re} \{ 1000 \cdot e^{j140^\circ} \cdot e^{j150^\circ} \cdot e^{j180^\circ} \cdot e^{j30^\circ} \}$$

$$= \operatorname{Re} \{ 1000 \cdot e^{j540^\circ} \} = \operatorname{Re} \{ -1000 + j0 \}$$

$$\Rightarrow \boxed{P_w = -1000 \text{ [W]}} \rightarrow \textcircled{B} \text{ W}$$

10.)

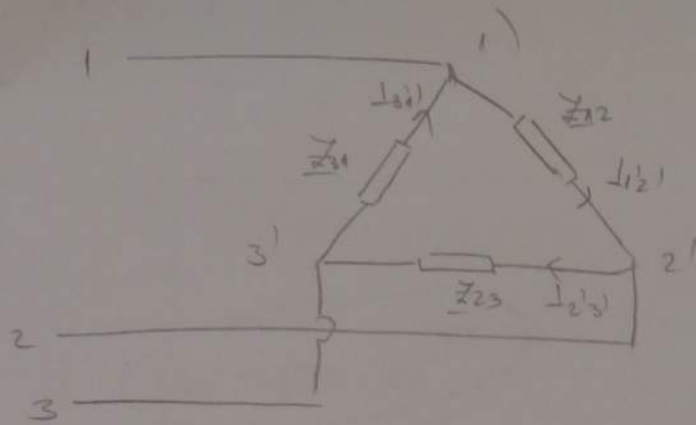
$$\underline{Z}_1 = 12 \cdot e^{j0^\circ}$$

$$\underline{Z}_2 = 10 \cdot e^{j45^\circ}$$

$$\underline{Z}_3 = 12 \cdot e^{j60^\circ}$$

$$U_L = 240 \text{ V}$$

$$I_{12}, I_{23}, I_{31} = ?$$



$$I_L = \sqrt{3} I_F; \quad U_L = U_F$$

$$\underline{U}_{12} = 240 \cdot e^{j0^\circ}$$

$$\underline{U}_{23} = 240 \cdot e^{j120^\circ}$$

$$\underline{U}_{31} = 240 \cdot e^{j240^\circ}$$

$$I_{12'} = \frac{U_{12}}{\underline{Z}_1} = \frac{240 \cdot e^{j0^\circ}}{12 \cdot e^{j0^\circ}} = 20 \cdot e^{j0^\circ}$$

$$I_{23'} = \frac{U_{23}}{\underline{Z}_2} = \frac{240 \cdot e^{j120^\circ}}{10 \cdot e^{j45^\circ}} = 24 \cdot e^{j75^\circ}$$

$$I_{31'} = \frac{U_{31}}{\underline{Z}_3} = \frac{240 \cdot e^{j240^\circ}}{12 \cdot e^{j60^\circ}} = 20 \cdot e^{j180^\circ}$$

⇒ ⊕ w

11.)

$$U_{10} = 100 \cdot e^{j0^\circ}$$

$$\Delta\varphi = ? \quad (U_{12}) = ?$$

d.r.f.

$$U_{10} = 100 \cdot e^{j0^\circ}$$

$$U_{20} = 100 \cdot e^{+j120^\circ}$$

$$U_{30} = 100 \cdot e^{+j240^\circ}$$

i.r.f.

$$U_{10} = 100 \cdot e^{j0^\circ}$$

$$U_{20} = 100 \cdot e^{+j120^\circ}$$

$$U_{30} = 100 \cdot e^{-j120^\circ}$$

$$U_{12} = 100 \cdot e^{j30^\circ}$$

$$U_{23} = 100 \cdot e^{-j30^\circ}$$

$$U_{31} = 100 \cdot e^{+j150^\circ}$$

$$U_{12} = 100 \cdot e^{-j30^\circ}$$

$$U_{23} = 100 \cdot e^{+j30^\circ}$$

$$U_{31} = 100 \cdot e^{-j150^\circ}$$

$$\Delta\varphi = 30 - (-30) = 60^\circ \Rightarrow \textcircled{c} \omega$$

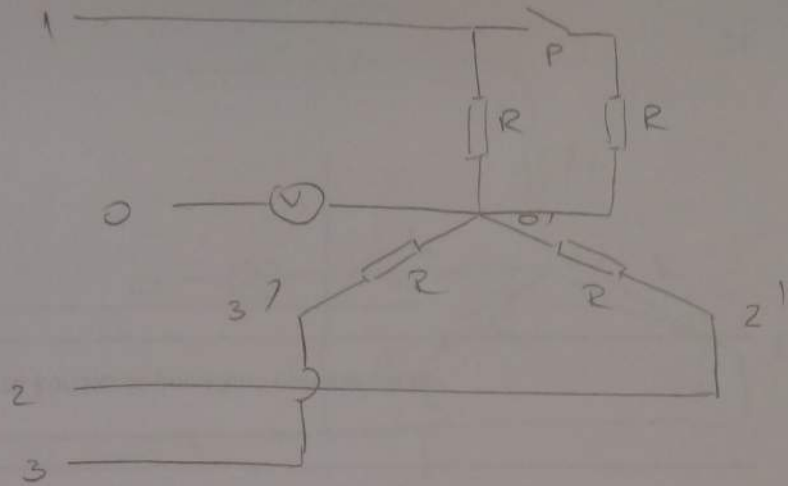
12.)

$$U_F = 220V$$

$$\Delta U = ?$$

$$U_L = \sqrt{3} U_F \Rightarrow$$

$$I_L = I_F$$



1° P - otvoreni

Simetričan potrošač $\Rightarrow U_{0'0} = 0V$

2° P - zatvoreni

$$U_{10} = 220 \cdot e^{j0^\circ}$$

$$U_{20} = 220 \cdot e^{+j120^\circ}$$

$$U_{30} = 220 \cdot e^{-j120^\circ}$$

$$U_{0'0} = \frac{\frac{2}{R} \cdot 220 \cdot e^{j0^\circ} + \frac{1}{R} \cdot 220 \cdot e^{+j120^\circ} + \frac{1}{R} \cdot 220 \cdot e^{-j120^\circ}}{\frac{2}{R} + \frac{1}{R} + \frac{1}{R}} =$$

$$= \frac{\frac{1}{R} (440 \cdot e^{j0^\circ} + 220 \cdot e^{+j120^\circ} + 220 \cdot e^{-j120^\circ})}{\frac{4}{R}} =$$

$$= \frac{440 - 110 + j130,53 - 110 - j130,52}{4} = \frac{220}{4}$$

$$U_{0'0} = 55$$

$$\Rightarrow \Delta U = 0 - 55 = -55 \Rightarrow | \Delta U | = 55V \Rightarrow \textcircled{D} \omega$$

1) $U_L = 346 \text{ V}$

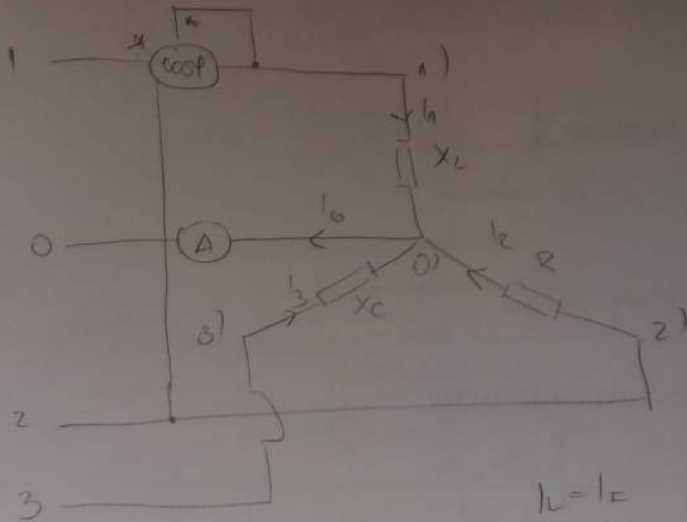
1. R. F.

$R = 4 \text{ } \Omega$

$X_L = 20 \text{ } \Omega$

$X_C = 10 \text{ } \Omega$

$\cos \varphi, I_A = ?$



$k = 1$
 $U_L = \sqrt{3} U_F$

$\underline{U}_{10} = 200 \cdot e^{j0^\circ}$
 $\underline{U}_{20} = 200 \cdot e^{j120^\circ}$
 $\underline{U}_{30} = 200 \cdot e^{-j120^\circ}$

$\underline{U}_{12} = \underline{U}_{10} - \underline{U}_{20} = 100 + j173,2 = 200 \cdot e^{j60^\circ}$

$I_2 = \frac{U_{20}}{R} = 50 \cdot e^{j120^\circ}$

$\underline{U}_{10} = -100 + j173,2$

$\cos \varphi = \cos(60 - 120^\circ) = \cos(-60) = 0,5$

\Rightarrow (D) W

2.)

$I_0 = I_1 + I_2 + I_3$

$I_1 = \frac{200 \cdot e^{j0^\circ}}{20 \cdot e^{j30^\circ}} = 10 \cdot e^{j30^\circ} = \sqrt{10}$

$I_2 = \frac{200 \cdot e^{j120^\circ}}{4} = 50 \cdot e^{j120^\circ} = -25 + j43,3$

$I_3 = \frac{200 \cdot e^{-j120^\circ}}{10 \cdot e^{-j30^\circ}} = 20 \cdot e^{j30^\circ} = 17,3 - j10$

$I_0 = -7,4 + j23,2 \Rightarrow$

$I_0 = 24,44 \text{ A} \Rightarrow$ (C)