

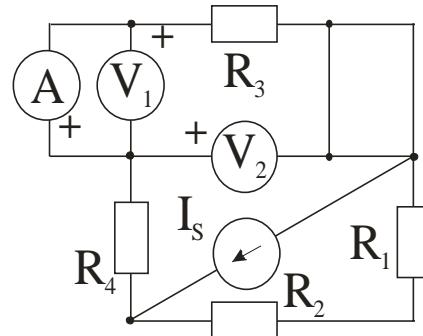
## PRVI DEO ISPITA

**Zadatak 1.** U kolu sa slike odrediti:

- a) pokazivanje idealnih mernih instrumenata,
- b) snagu koja se razvija na otporniku  $R_3$ ,
- c) snagu strujnog generatora.

Poznato je:

$$I_S = 1A, R_1 = 5\Omega, R_2 = 5\Omega, R_3 = 20\Omega, R_4 = 10\Omega.$$

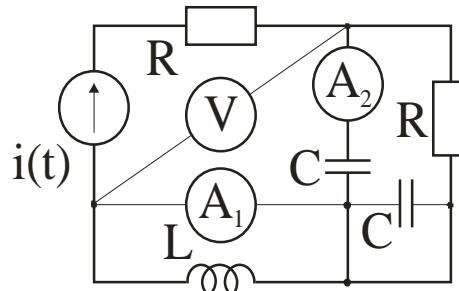


**Zadatak 2.** U kolu sa slike odrediti:

- a) pokazivanje idealnih mernih instrumenata,
- b) kompleksnu snagu strujnog generatora.

Poznato je:  $i_S(t) = 10\sqrt{2} \cos(1000 \cdot t + \pi/2) A$ ,

$$R = 20\Omega, L = 20mH, C = 50\mu F.$$

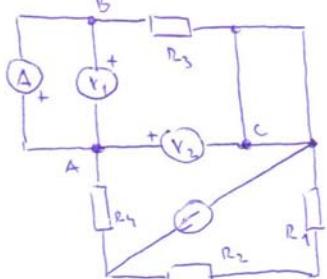


## DRUGI DEO ISPITA

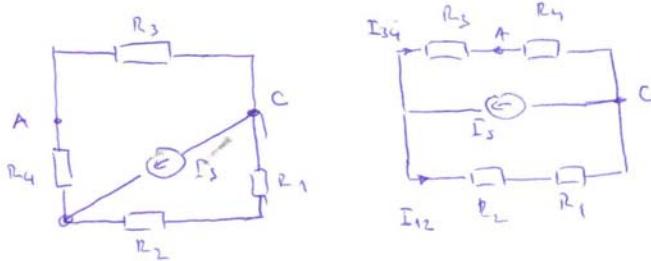
## CEO ISPIT TRAJE 3 SATA

**NAPOMENA:** Svaki od dva računska zadatka se boduje od 0 do 25 poena, a svako teorijsko pitanje se boduje od 0 do 10 poena. Za pozitivnu ocenu je potrebno da se uradi 50 % računskih zadataka (prvi deo ispita), pri čemu broj bodova na svakom zadatku mora da bude veći od 8, i 50 % drugog dela ispita.

### ZADANIE 1



$$I_s = 1A \quad R_1 = 5\Omega \quad R_2 = 5\Omega \\ R_3 > 20\Omega \quad R_4 = 10\Omega$$



$$I_{12} = \frac{R_3 + R_4}{R_1 + R_2 + R_3 + R_4} \cdot I_s = \frac{20 + 10}{5 + 5 + 20 + 10} \cdot 1 = \frac{30}{40} = 0,75A$$

$$I_{34} = I_s - I_{12} = 0,25A$$

(10)

a)  $U_{V1} = U_{B4} = 0$  zbiog brzkoj spójn

$$U_{V2} = U_{AC} = R_3 \cdot I_{34} = 20 \cdot 0,25 = 5V$$

$$I_A = I_{34} = 0,25A = 0,25A$$

(5)

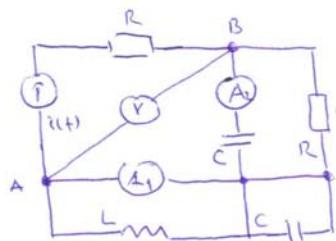
b)  $P_{R3} = R_3 \cdot I_{34}^2 = 20 \cdot (0,25)^2 = \cancel{4,25} \times 1 = 1,25W$

(5)

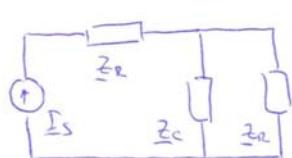
c)  $P_S = U_s \cdot I_s = (R_3 + R_4) \cdot I_{34} \cdot I_s = (20 + 10) \cdot 0,25 \cdot 1 \\ = \cancel{2,5} \times 1 = 7,5W$

(5)

### ZADANIE 2



$$i_s(t) = 10\sqrt{2} \cos(1000t + \frac{\pi}{2}) A \\ R = 20\Omega \quad L = 20mH \quad C = 50\mu F$$



$$I_s = \frac{10\sqrt{2}}{R} \cdot e^{j\frac{\pi}{2}} = 10e^{j\frac{\pi}{2}} \\ = 10 \left[ \cos \frac{\pi}{2} + j \sin \frac{\pi}{2} \right] = j10A$$

$$\underline{Z}_R = R = 20\Omega$$

$$\underline{Z}_L = j\omega L = j1000 \cdot 20 \mu H = j2000\Omega$$

$$\underline{Z}_C = -j\frac{1}{\omega C} = -j\frac{1}{1000 \cdot 50 \mu F} = -j20\Omega$$

(5)

a)  $I_{A1} = I_s = 10A$

$$\underline{Z}_C = \frac{\underline{Z}_R}{\underline{Z}_R + \underline{Z}_C} \cdot \underline{I}_s = \frac{20}{20 - j20} \cdot j0$$

$$I_{A2} = I_C = 5\sqrt{2}A$$

$$= j10 \cdot \frac{1}{1-j} = j10 \cdot \frac{1+j}{2}$$

$$I_C = (6 + j5)A = 5\sqrt{2} \cdot e^{j\frac{\pi}{4}} A$$

$$= (-5 + j5)A$$

(5)

(5)

$$U_V = U_C = 100\sqrt{2}V$$

$$U_C = \underline{Z}_C \underline{I}_s = -j20 \cdot (-5 + j5) \\ = 100 + j100 = 100\sqrt{2} \cdot e^{j\frac{\pi}{4}} V$$

(5)

b)  $\underline{Z}_{eq} = \underline{Z}_R + \underline{Z}_C // \underline{Z}_L = 20 + \left( \frac{-j20 \cdot 20}{-j20 + 20} \right)$

$$= 20 - j20 \cdot \frac{1}{1-j} = 20 - j20 \cdot \frac{1+j}{2} = 20 - j10 + j0 \\ = (30 - j10)\Omega$$

(10)

$S_g = U_s \cdot \underline{I}_s^* = \underline{Z}_{eq} \cdot \underline{I}_s \cdot \underline{I}_s^* = \underline{Z}_{eq} \cdot |I_s|^2 = (3000 - j1000) V^2$