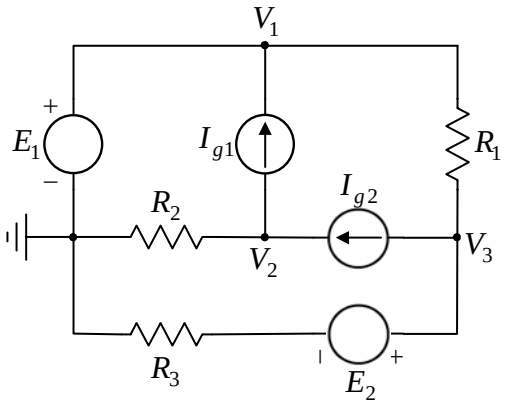
Osnovi elektronike - Odsek za SI

Ispit održan 02.02.2008. – rešenja zadataka

Prvi deo

3.



a) $V_1 = 3\,\mathrm{V};\ V_2 = 4\,\mathrm{V};\ V_3 = 6\,\mathrm{V}$

b) $P_{R2} = 8\,\mathrm{W};\ P_{Ig2} = -8\,\mathrm{W};\ P_{E2} = 80\,\mathrm{W}$

Drugi deo

3. $v(t) = 2V \cdot \cos(\omega t - 45^o) \Rightarrow \underline{V} = \sqrt{2} \cdot e^{-j45^o} V = (1 - j)V$

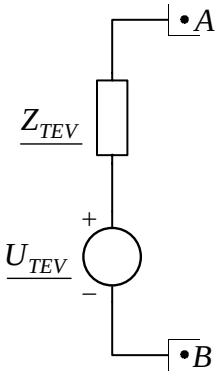
$i(t) = 2\sqrt{2}A \cdot \sin(\omega t) = 2\sqrt{2}A \cdot \cos(\omega t - 90^o) \Rightarrow \underline{I} = 2 \cdot e^{-j90^o} A = -j2A$

$\underline{Z_L} = j\omega \cdot 40\mu H = j2\Omega$

$$\underline{Z_C} = \frac{1}{j\omega \cdot 20\mu F} = -j1\Omega$$

a) $\underline{U_{TEV}} = (1 - 2j)V$

$$\underline{Z_{TEV}} = \frac{7 + j}{10}\Omega$$



b) $\underline{S_P} = \frac{25}{14} - j\frac{25}{98}$; $P_P = \frac{25}{14} W$; $Q_P = -\frac{25}{98} VAr$; $S_P = \frac{125\sqrt{2}}{98} VA$; $\cos\phi = \frac{P_P}{S_P} = \frac{7}{5\sqrt{2}}$

Treći kolokvijum

4. a) $I_D = 1\,\text{mA}$; $V_G = 4\,\text{V}$; $V_S = 1\,\text{V}$; $V_D = 12\,\text{V}$;

b) $g_m = \sqrt{2 I_D B} = 1\,\text{mS}$; $a_v = \frac{g_m (R_S \parallel R_P)}{1 + g_m (R_S \parallel R_P)} = 0{,}4545$; $R_{ul} = R_1 \parallel R_2 = \frac{20}{3}\,\text{k}\Omega$;

$R_{izl} = R_S \parallel \frac{1}{g_m} = 500\,\Omega$

5. $v_I = v_2 \cdot (\frac{R_4}{R_3} + \frac{R_2 R_4}{R_3 R_5} + \frac{R_4}{R_5} + 1) - v_1 \cdot (\frac{R_4}{R_3} + \frac{R_2 R_4}{R_3 R_5} + \frac{R_4}{R_5} + \frac{R_2 R_4}{R_1 R_3})$