ISPIT IZ OSNOVA ELEKTRONIKE **31.08.2011.**

ODSEK ZA TELEKOMUNIKACIJE I INFORMACIONE TEHNOLOGIJE
ODSEK ZA SIGNALE I SISTEME

REŠENJA ZADATAKA

1. a) $R_1 \approx 2.2\text{k}\Omega$; $R_2 = 606\Omega$; $R_3 = 5\text{k}\Omega$.

b) $a = \dfrac{v_i}{v_g} = g_{m3} R_3 \dfrac{g_{m1}\left(R_2 \parallel r_{\pi 3}\right)}{1 + g_{m1}\left(R_1 \parallel \dfrac{r_{\pi 2}}{\beta_0 + 1}\right)} \approx 1972$.

c) $R_{ul} = r_{\pi 1} + \left(\beta_0 + 1\right) \cdot \left(R_1 \parallel \dfrac{r_{\pi 2}}{\beta_0 + 1}\right) \approx 4.97\text{k}\Omega$; $R_{izl} = R_3 = 5\text{k}\Omega$.

d) $V_I = 0$;
$v_{IMAX} = 5\text{V}$ (Q_3 na granici zakočenja); $v_{IMIN} = -4.8\text{V}$ (Q_3 na granici zasićenja);
$V_{im\max} = 4.8\text{V}$.

4. a) $R_2 = -R_1\left(1 + \dfrac{V_P}{V_Z + V_{EB}}\right) = 1.25\text{k}\Omega$.

b) $v_P = -5\text{V} = const$, za $0 \le i_P \le I_{PMAX}$;
$i_P = I_{PMAX} = const$, za $-5\text{V} \le v_P \le 0$.

c) $I_{PMAX} = -\dfrac{P_{DQ1\max}}{V_{EB} + V_u} = 0.8\text{A}$; $R_S = \dfrac{V_{EB}}{I_{PMAX}} = 0.875\Omega$.

d) $R_{0\max} = \dfrac{V_P - 2V_{EB} - V_u}{I_{Z\min} + \dfrac{I_{PMAX}}{\beta_{F1}}} = 560\Omega$.