ODSEK ZA FIZIČKU ELEKTRONIKU ODSEK ZA SIGNALE I SISTEME ODSEK ZA TELEKOMUNIKACIJE I INFORMACIONE TEHNOLOGIJE

REŠENJA ZADATAKA

1. a)
$$I_{C1} = 1 \text{mA}$$
; $I_{C2} = 1 \text{mA}$; $I_{C3} = 1 \text{mA}$.

b)
$$a = \frac{v_i}{v_g} = g_{m1} R_{C1} g_{m2} R_{C2} \frac{g_{m3} R_{E3}}{1 + g_{m3} R_{E3}} \approx 9807$$
.

c)
$$R_{ul} = r_{\pi 1} \rightarrow \infty$$
; $R_{izl} = R_{E3} \parallel \frac{r_{\pi 3} + R_{C2}}{\beta_0 + 1} = R_{E3} \parallel \frac{1}{g_{m3}} \approx 24.9\Omega$.

d)
$$V_I = 0$$
;

 $v_{IMAX}=5{\rm V}$ (Q_3 na granici zakočenja); $v_{IMIN}=-3.7{\rm V}$ (Q_2 na granici zasićenja); $V_{im\,{\rm max}}=3.7{\rm V}$.

4. a)

$$\begin{split} &v_{I}[V] = 12V = const \text{ , za } -12V \leq v_{G} \leq -4,8V \text{ (IOP-poz. zasićenje, } D_{1}\text{-OFF, } D_{2}\text{-ON)}; \\ &v_{I}[V] = -2v_{G}[V] + 2,4 \text{ , za } -4,8V \leq v_{G} \leq -1,2V \text{ (IOP-lin. režim, } D_{1}\text{-OFF, } D_{2}\text{-ON)}; \\ &v_{I}[V] = -4v_{G}[V] \text{ , za } -1,2V \leq v_{G} \leq 1,2V \text{ (IOP-lin. režim, } D_{1}\text{-OFF, } D_{2}\text{-OFF)}; \\ &v_{I}[V] = -2v_{G}[V] - 2,4 \text{ , za } 1,2V \leq v_{G} \leq 4,8V \text{ (IOP-lin. režim, } D_{1}\text{-ON, } D_{2}\text{-OFF)}; \\ &v_{I}[V] = -12V = const \text{ , za } 4,8V \leq v_{G} \leq 12V \text{ (IOP-neg. zasićenje, } D_{1}\text{-ON, } D_{2}\text{-OFF)}. \end{split}$$