

Elementi elektronike jun 2016 – REŠENJA

$$3. I_{B1} = \frac{I_P}{\beta} = 0.02 \text{ mA}$$

$$I_{E1} = I_{B1} + I_P = 2.02 \text{ mA}$$

$$V_{R1} = V_{EE} - V_{EB1} - V_Z = 7.3 \text{ V}$$

$$R_1 = \frac{V_{R1}}{I_{B1} + I_Z} = 1.45 \text{ k}\Omega$$

Istim postupkom dolazi se do:

$$V_{R2} = 4 \text{ V}, R_2 = 1.98 \text{ k}\Omega$$

$$V_{BC1} = V_{EE} - V_{R2} - V_{EB1} - I_P R_P$$

Uslov da T_1 radi u aktivnom režimu je

$$V_{BC1} \geq 0$$

te je

$$R_P \leq 3.65 \text{ k}\Omega$$

4.

a)

$$I_D = I_0$$

$$g_m = \sqrt{2k_n I_D} = 1.34 \text{ mS}$$

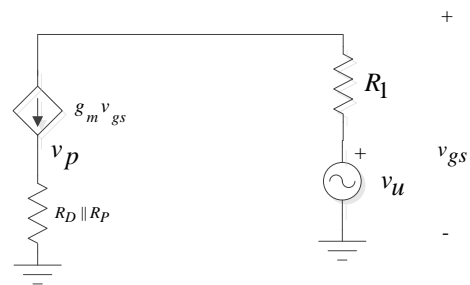
Na slici je prikazano kolo za mali signal. Važi:

$$v_p = (R_D \parallel R_P) g_m v_{gs},$$

$$v_{gs} = \frac{v_u}{1 + g_m R_1},$$

$$A_v = \frac{(R_D \parallel R_P) g_m}{1 + g_m R_1} = 9.42.$$

b)

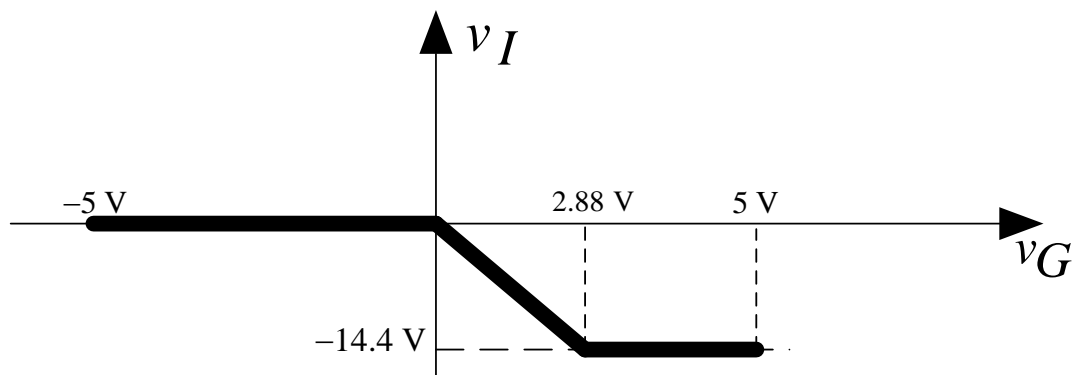


$$R_u = \frac{v_u}{g_m v_{gs}} = R_1 + \frac{1}{g_m}$$

$$R_u = 796.3 \Omega$$

6.

$$v_I = \begin{cases} 0 \text{ V} & -5 \text{ V} \leq v_G < 0 & \text{D1 on, Q off} \\ -\frac{R_2}{R_1} v_G = -5 v_G & 0 \text{ V} \leq v_G < 2.88 \text{ V} & \text{D1 off, Q aktivni režim} \\ -14.4 \text{ V} & 2.88 \text{ V} \leq v_G < 5 \text{ V} & \text{OP negativno zasićenje} \end{cases}$$



7.

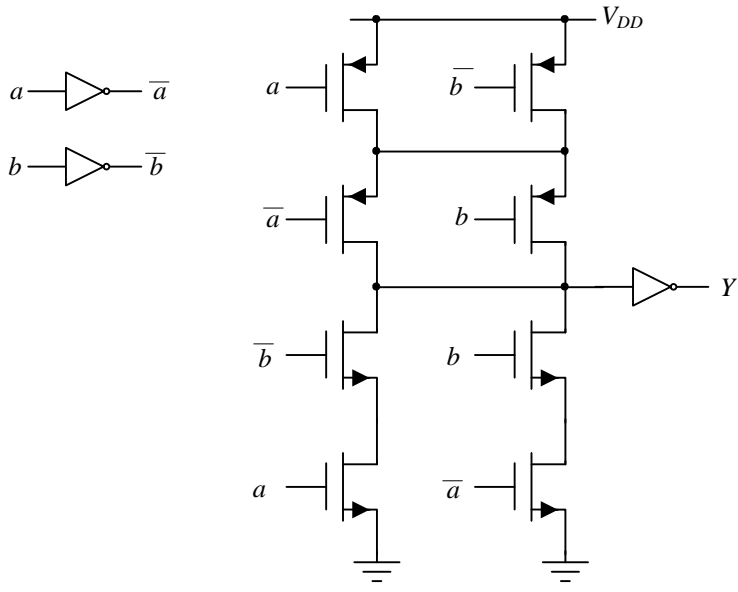
a) $Y = \overline{(AB) + (CD)}$

b) $Y = a \oplus b = a\bar{b} + \bar{a}b = \overline{(AB) + (CD)}$

Upoređivanjem se određuje

$$A = a, B = \bar{b}, C = \bar{a}, D = b$$

Uz potrebu za još jednim izlaznim invertorom



8.

