Elementi elektronike – JUL 2018 – REŠENJA

3. DC analiza:

$$I_{D1} = I_{D2} = I_G$$

$$V_I = V_{D2} + R_3 I_G = 1.7V$$

AC analiza:

$$r_{d1} = \frac{V_t}{I_{D1}} = 2.5\ \Omega$$

$$r_{d2} = \frac{V_t}{I_{D2}} = 2.5\ \Omega$$

$$V_i = (R_4\ \mathrm{P}(R_3 + r_{d2}))I_g = 336.07\,mV$$

$$v_i = V_i \sin(\omega t)$$

Ukupni signal je jednak $v_I = V_I + v_i$.

4. a)

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

$$R_u = R_1 + \frac{1}{g_m}\,\mathrm{P}\,R_S$$

b)

$$V_{GS} = 2\,\mathrm{V}$$

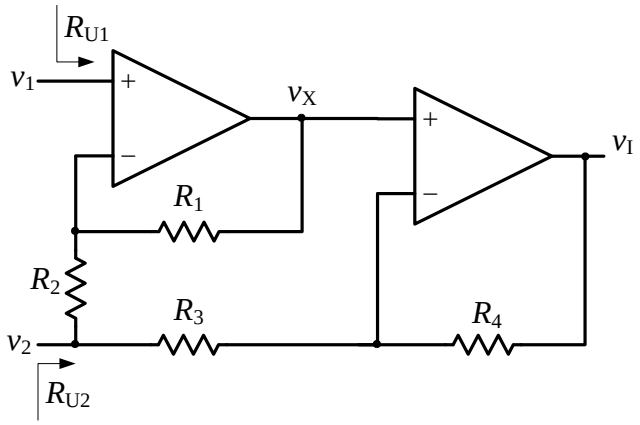
$$I_D = 1.5\,\mathrm{mA}$$

$$g_m = \sqrt{2k_n I_D} = 3\,\mathrm{mS}$$

$$A_v = 2.4708$$

$$R_u = 335.71\ \Omega$$

7.

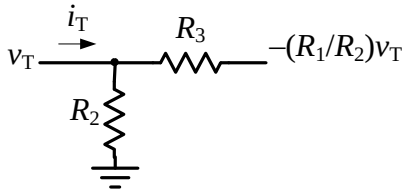


$$v_X = v_1 - R_1\frac{v_2 - v_1}{R_2} = v_1\left(1+\frac{R_1}{R_2}\right) - \frac{R_1}{R_2}v_2$$

$$v_I = v_X - R_4\frac{v_2 - v_X}{R_3} = v_1\left(1+\frac{R_1}{R_2}\right)\left(1+\frac{R_4}{R_3}\right) - v_2\left(\frac{R_4}{R_3} + \frac{R_1}{R_2}\left(1+\frac{R_4}{R_3}\right)\right)$$

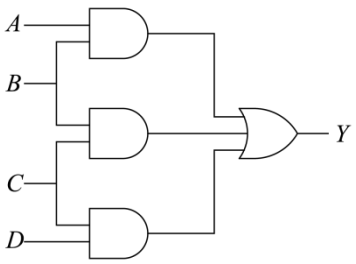
$R_{U1} = \infty$

Određivanje R_{U2}:



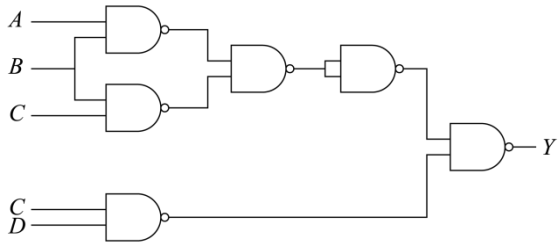
$$R_{U2} = \frac{v_T}{i_T} = R_2 \parallel \frac{R_3}{1+\frac{R_1}{R_2}}$$

8. a) $Y = AB + BC + CD$



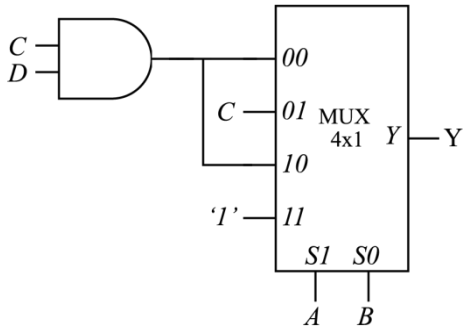
Slika 1. Rešenje tačke pod a).

b) $Y = AB + BC + CD = \overline{\overline{AB + BC + CD}} = \overline{\overline{AB} \cdot \overline{BC} \cdot \overline{CD}} = \overline{\overline{\overline{AB} \cdot \overline{BC} \cdot \overline{CD}}}$



Slika 2. Rešenje tačke pod b)

c)



Slika 3. Rešenje tačke pod c).

9. Moduo brojanja brojača je pet.