REŠENJA ZADATAKA

1. KOLOKVIJUM

2. $v_X(t) = \begin{cases} 5\text{V}, & za \quad t < 0 \\ 5\text{V} \cdot e^{-\frac{t}{C_{UL} \cdot r_{dsNMOS}}} = 5\text{V} \cdot e^{-\frac{t}{5 \cdot 10^{-10}s}}, & za \quad t \geq 0 \end{cases}$

$v_X(T_1) = 2{,}5\text{V} \quad \Rightarrow \quad T_1 = 5 \cdot 10^{-10}\text{s} \cdot \ln 2 = 347\,\text{ps}$

$v_Y(t) = \begin{cases} 0, & za \quad t < T_1 \\ 5\text{V} \cdot \left(1 - e^{-\frac{t-T_1}{C_{UL} \cdot r_{dsPMOS}}}\right) = 5\text{V} \cdot \left(1 - e^{-\frac{t-T_1}{10^{-9}s}}\right), & za \quad t \geq T_1 \end{cases}$

$v_Y(T_2) = 2{,}5\text{V} \quad \Rightarrow \quad T_2 = T_1 + 10^{-9}\text{s} \cdot \ln 2 = 1{,}04\,\text{ns}$

$v_Z(t) = \begin{cases} 5\text{V}, & za \quad t < T_2 \\ 5\text{V} \cdot e^{-\frac{t-T_2}{C_M \cdot r_{dsNMOS}}} = 5\text{V} \cdot e^{-\frac{t-T_2}{2 \cdot 10^{-9}s}}, & za \quad t \geq T_2 \end{cases}$

$v_Z(T_3) = 2{,}5\text{V} \quad \Rightarrow \quad T_3 = T_2 + 2 \cdot 10^{-9}\text{s} \cdot \ln 2 = 2{,}426\,\text{ns}$

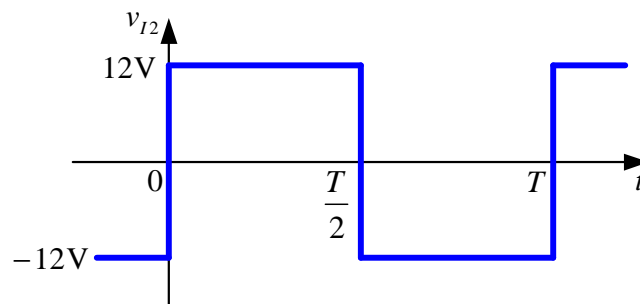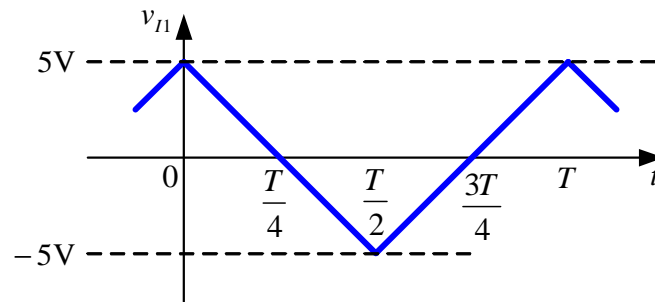$T_d = T_3 = 2{,}426\,\text{ns}$
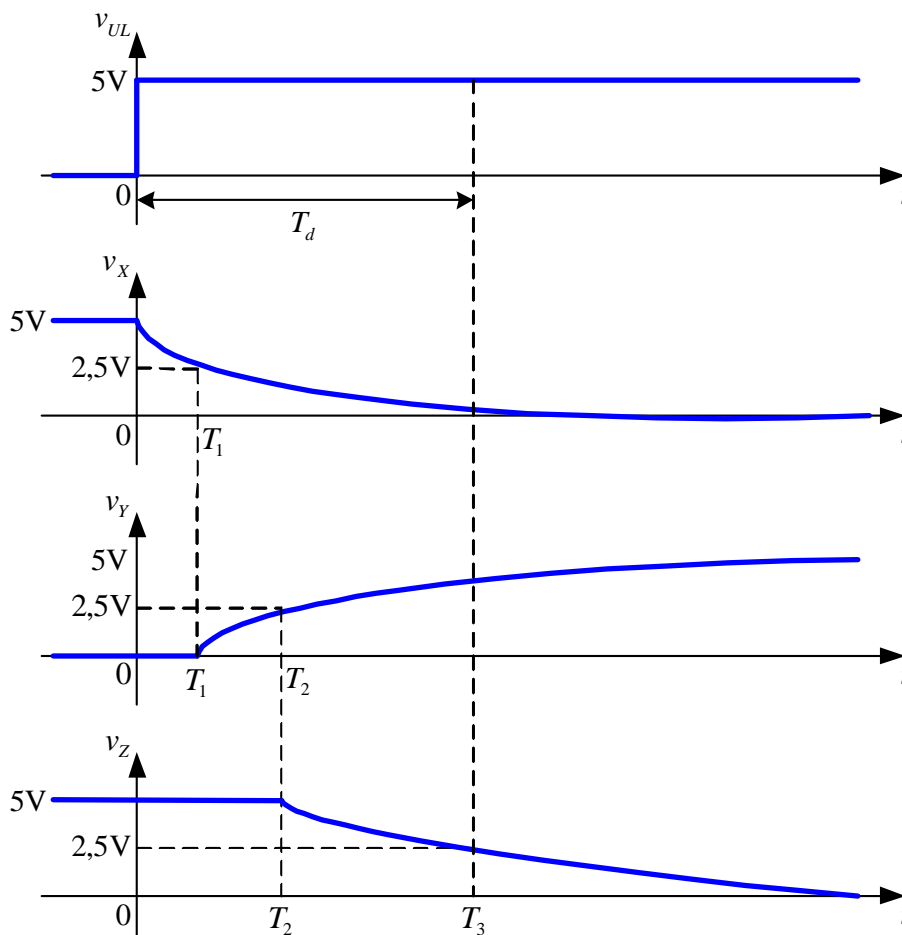
2. KOLOKVIJUM

2.

$$v_{I1} = \begin{cases} -2{,}4 \cdot 10^5 \cdot \left(t - \dfrac{T}{4} \right), & za \quad 0 \le t \le \dfrac{T}{2} \\ 2{,}4 \cdot 10^5 \cdot \left(t - \dfrac{3T}{4} \right), & za \quad \dfrac{T}{2} \le t \le T \end{cases}$$, signal se dalje periodično ponaša.

$T = 83{,}33\,\mu s$,

$f = 12\,kHz$.

3. KOLOKVIJUM

2. a) Prekidač je zatvoren za $Q_i = 0$, a otvoren za $Q_i = 1$.

b) $R_S = 0{,}95\,k\Omega$　　　　　　$R_0 = 56\,k\Omega$　　$R_1 = 26\,k\Omega$　　$R_2 = 11\,k\Omega$　　$R_3 = 3{,}5\,k\Omega$

c) $R_{bo} = 1{,}28\,k\Omega$　　　　　　$V_{MAX} = 5{,}6\,V$　　$V_{MIN} = -6{,}4\,V$