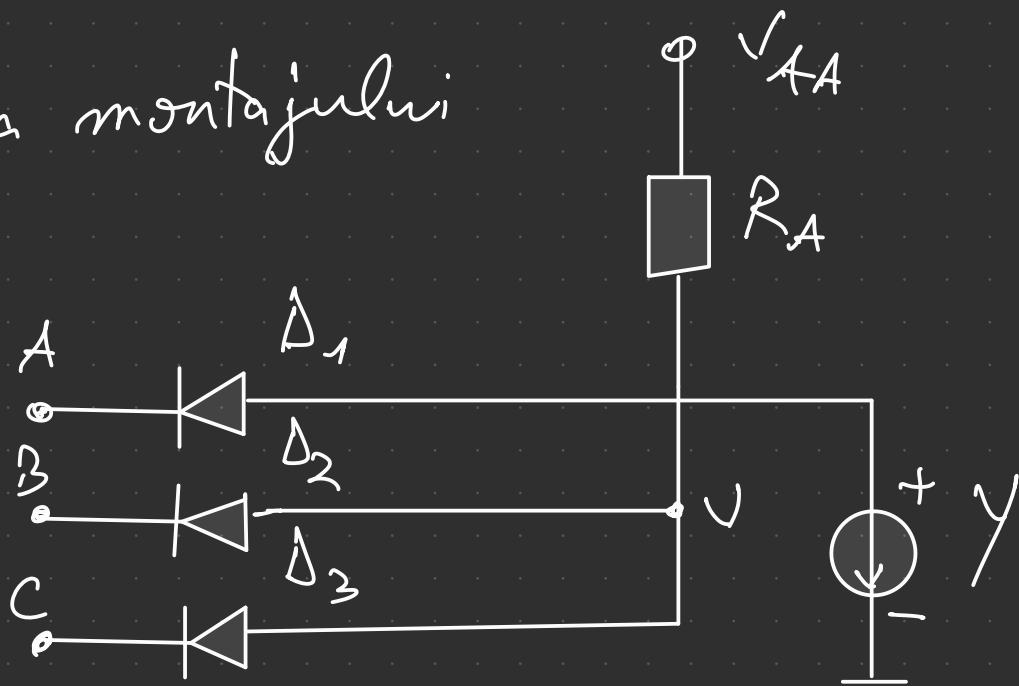① **Scopul lucrării**

Se vor studia circuitele logice cu diode semiconductoare în regim static și dinamic.

② **Circuitul**
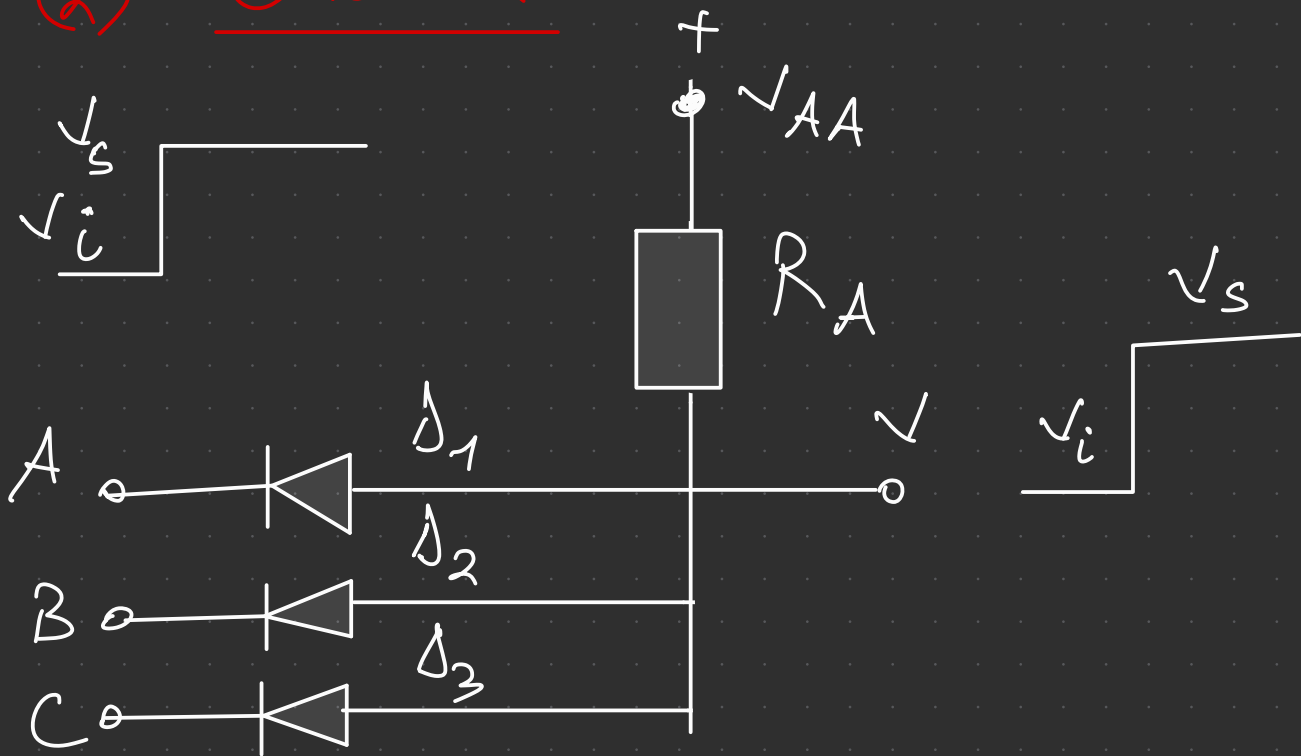
③ Mersul lucrării

Schema montajului

③.1
$V_{AA} = 15 V$
$R_A = 10 k \Omega$
$V_I = 0 V$
$V_S = 5 V$

a) $V_A = V_B = V_C = V_I$

b) $V_A = V_B = V_C = V_S$

c) $V_A = V_I$, $V_B = V_C = V_S$

d) $V_A = V_B = V_I$, $V_C = V_S$
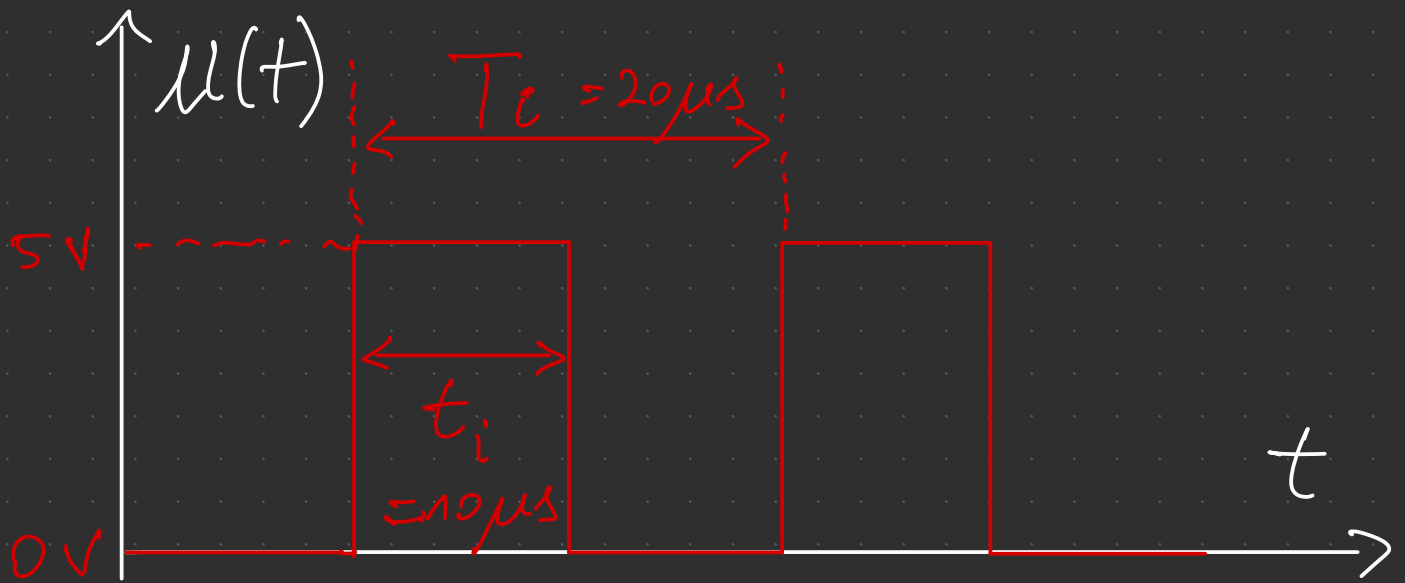
③.2 → măsurare curent de intrare pe A

③.3 → verificare funcția SI

③.4 → pt. cazul $V_A = V_B = V_C = 5 V$

→ se aplică la intrare un impuls cu
parametrii definiți astfel
$t_i = 10 \mu s$ | $V_I = 0 V$; $V_S = 5 V$ | $T = 20 \mu s$

$u(t)$

$T_C = 20\mu s$

5 V

t_i
$= 10\mu s$

0 V

t

<u>Obs.</u> → vizualizare semnal de la ieșirea porții ; oscilografiere

→ măsurare T_1 ; T_C pt. parametrii dați

→ măs. T_1 , T_C pt.
  100 pF
  220 pF
  470 pF
  1 nF
  1,5 nF

→ se modifică V_{AA} → 5V, 10V, 20V
  (capacitate de 100 pF) → comp. cu 15V

$$T_2 = R\,C\,\ln 2 \qquad R_A = 13k\Omega$$
$$T_C = ? \qquad a)\ C = 100pF$$

$$T = 25\mu s\ (5d\acute{\iota}v \cdot 5\mu s)$$
$$t_i = 10\mu s\ (2d\acute{\iota}v \cdot 5\mu s)$$
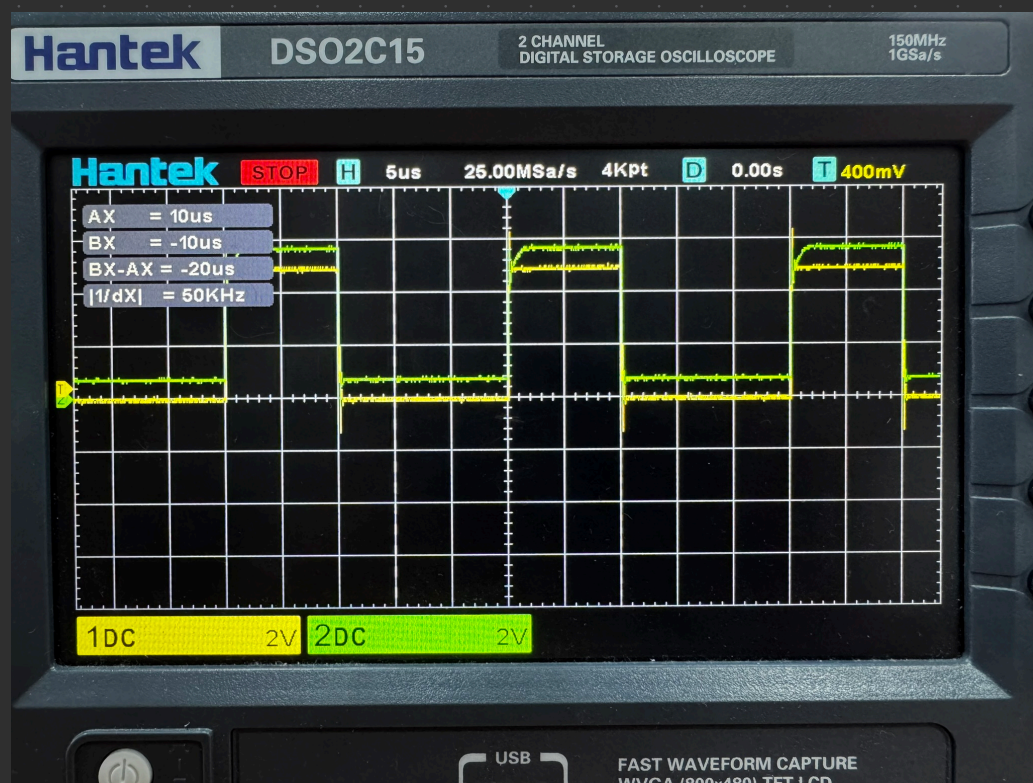
$$T_1 = 13 \cdot 10^3 \cdot 100 \cdot 10^{-12}\ \ln 2$$
$$= 1300 \cdot 10^{-9}\ \ln 2$$
$$\sim 9{,}01 \cdot 10^{-7}\ s\ \left(calcul\right)$$
$$\big\}\sim 900\ ns$$

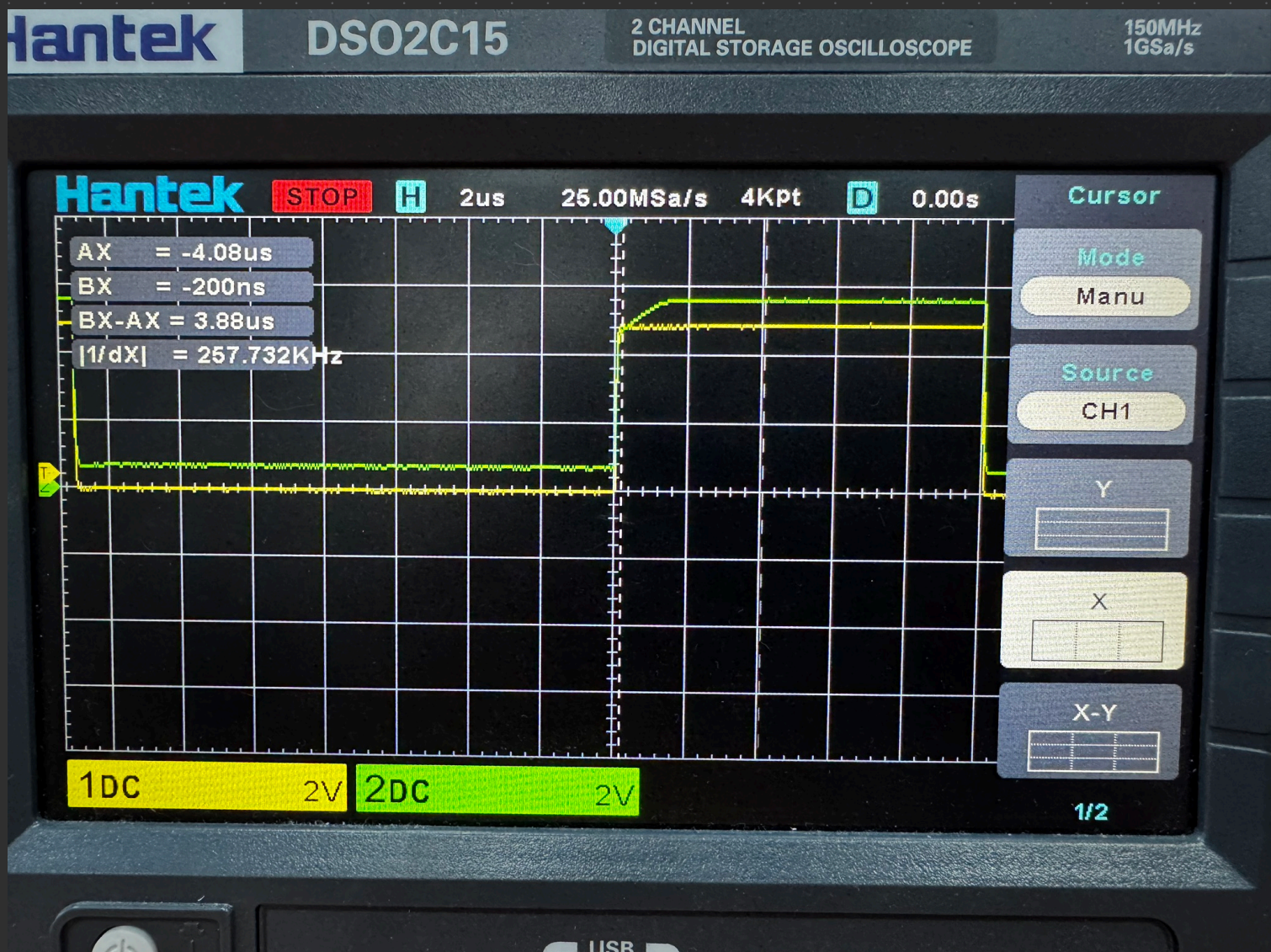$$T_1 = 900\ ns\ \left(cursor\right)$$
$$t_c \sim 200\ ns$$

b) $\quad C = 220\ pF$

$$T_2 = RC\ ln\ 2$$

$$= 13 \cdot 10^3 \cdot 220 \cdot 10^{-12}\ ln\ 2$$

$$= 1982\ ns = 1,98\ \mu s \atop (calcul)$$
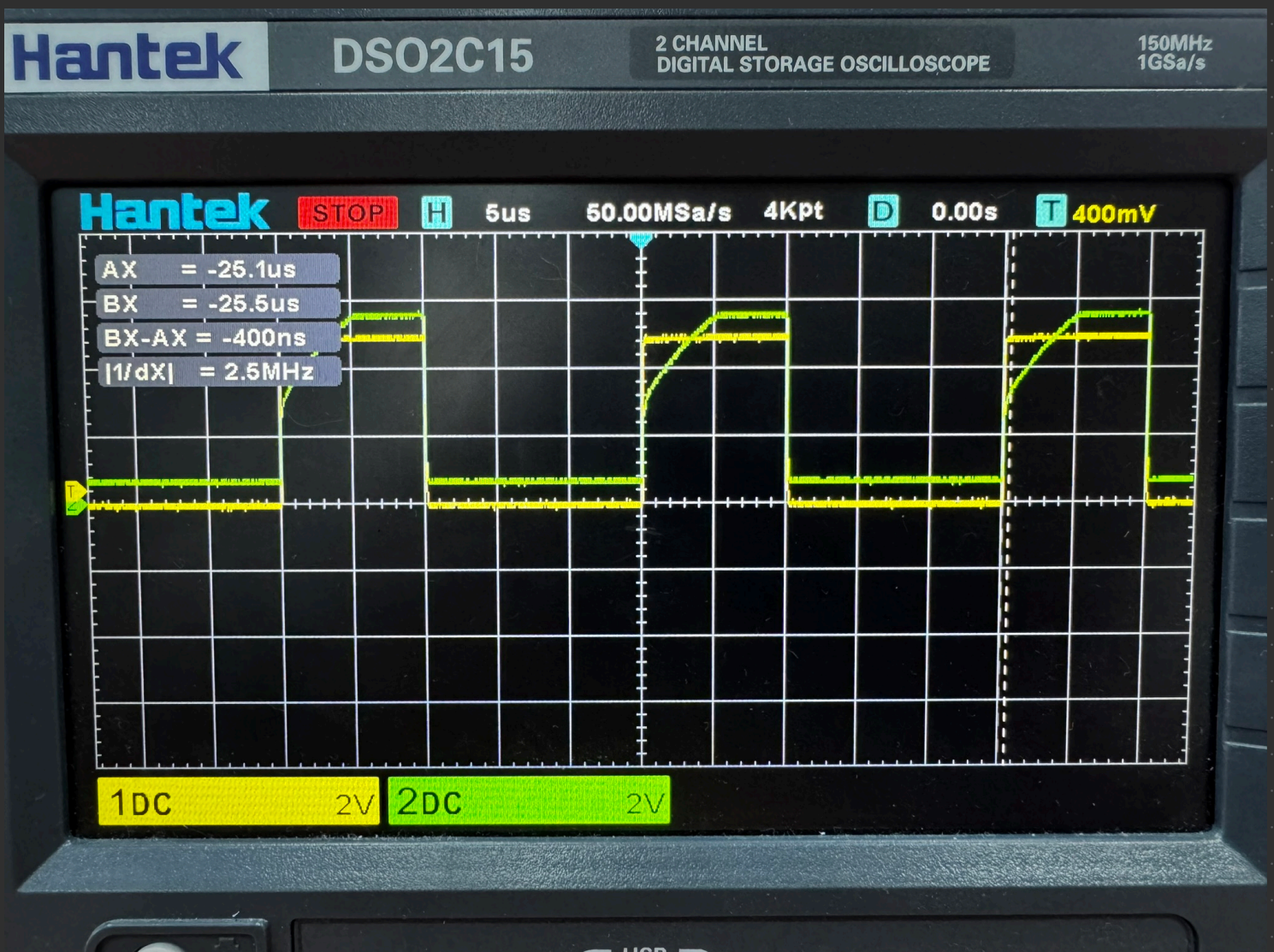
$$T_1 = 1,12\ \mu s\ (cursor)$$

$$t_c = 160\ ns$$

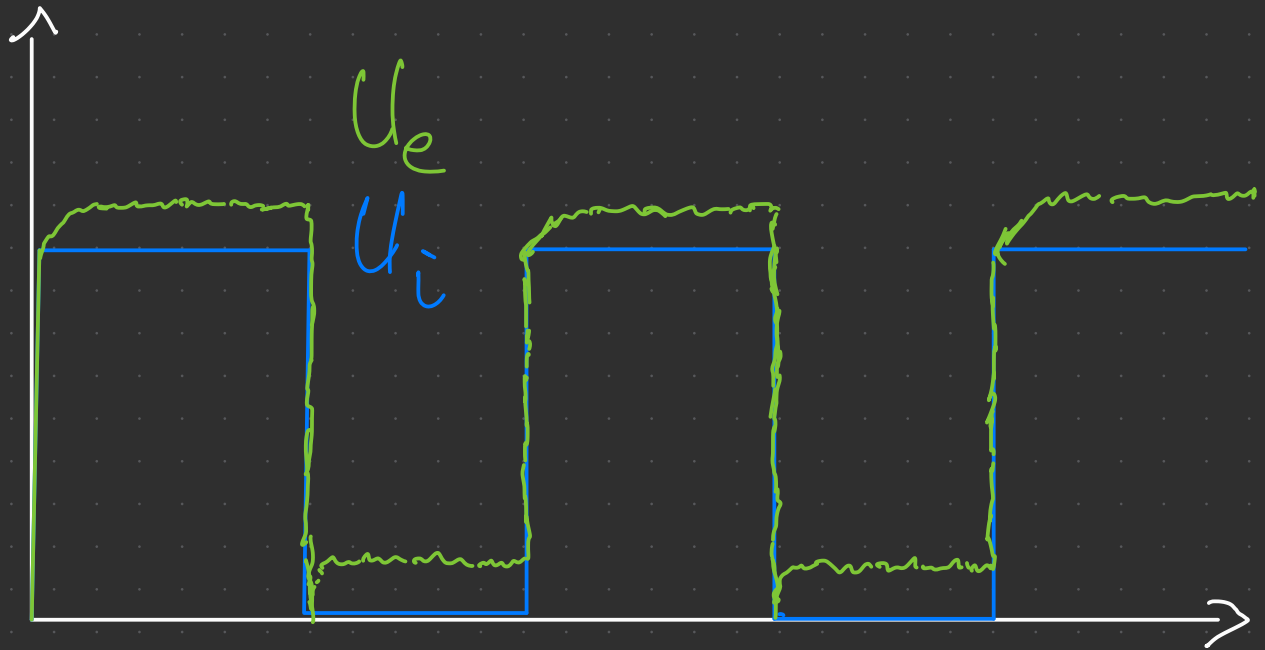c) $\quad C = 470\, pF$

$$T_R = 4{,}3\ \mu s \quad (\text{cursor})$$

$$T_R = RC \ln 2 = 13 \cdot 10^{3} \cdot 470 \cdot 10^{-12} \ln 2$$

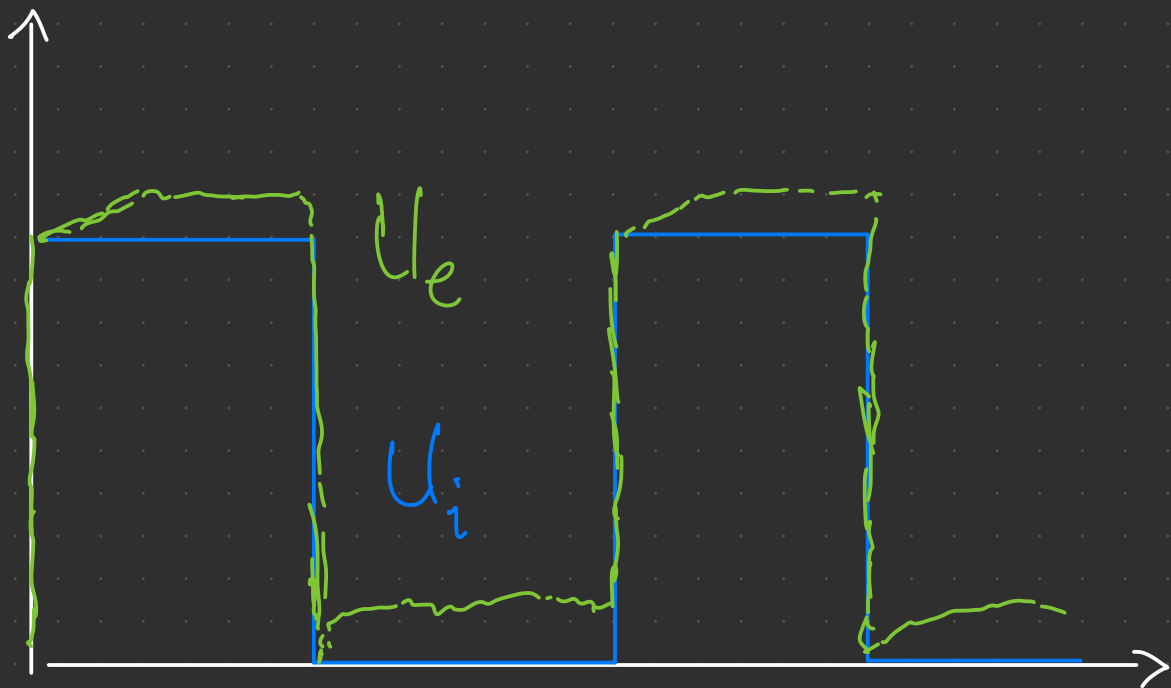$$= 4235 \cdot 10^{-9} = 4{,}235\ \mu s$$

$$t_c = 200\ ns$$

a) C = 100 pF

U_e

U_i

b) C = 220 pF

U_e

U_i

c) $C = 470 \, pF$