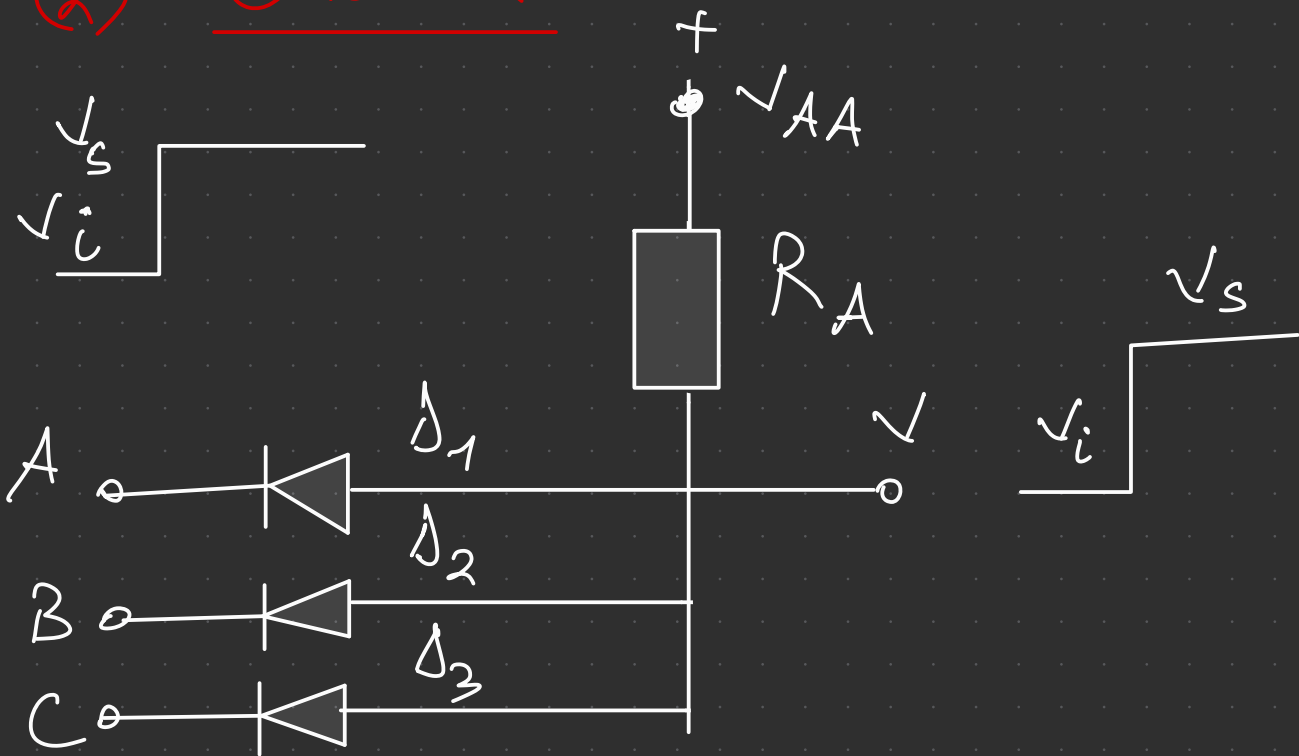


Circuite Logice cu diode. Poarta Şi

① Scopul lucrării

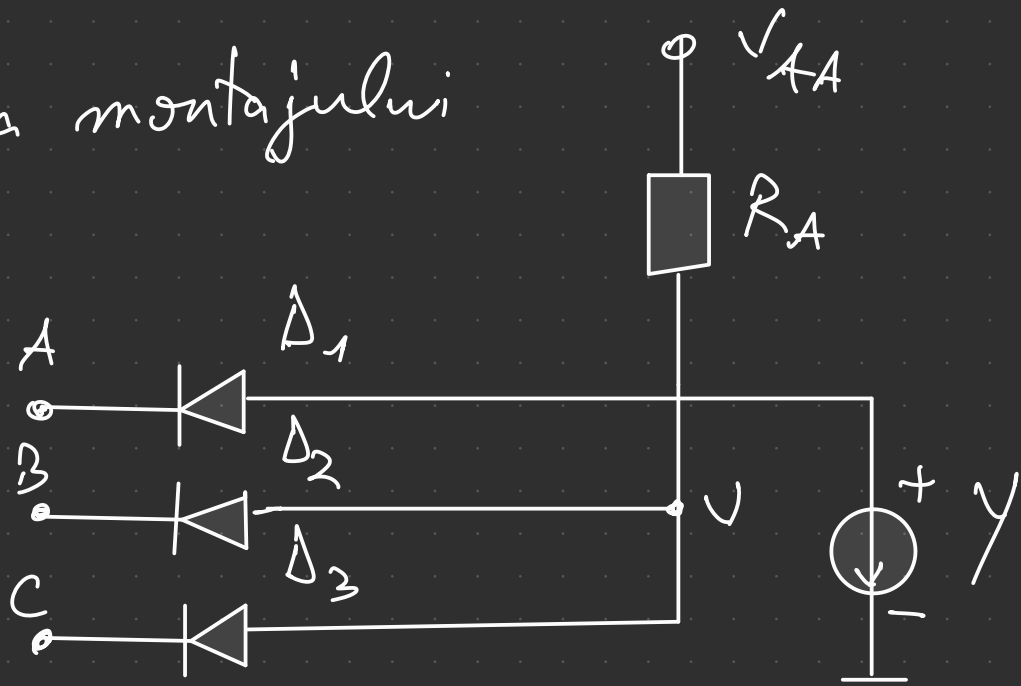
Se vor studia circuitele logice cu diode semiconductoare în regim static şi dinamic.

② Circuitul



③ Mersul lucrării

Schema montajului



③.1

$$V_{AA} = 15V$$

$$R_A = 10k\Omega$$

$$V_I = 0V$$

$$V_S = 5V$$

$$a) V_A = V_B = V_C = V_I$$

$$b) V_A = V_B = V_C = V_S$$

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

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

③.2

→ măsurare curent de intrare pe A

③.3

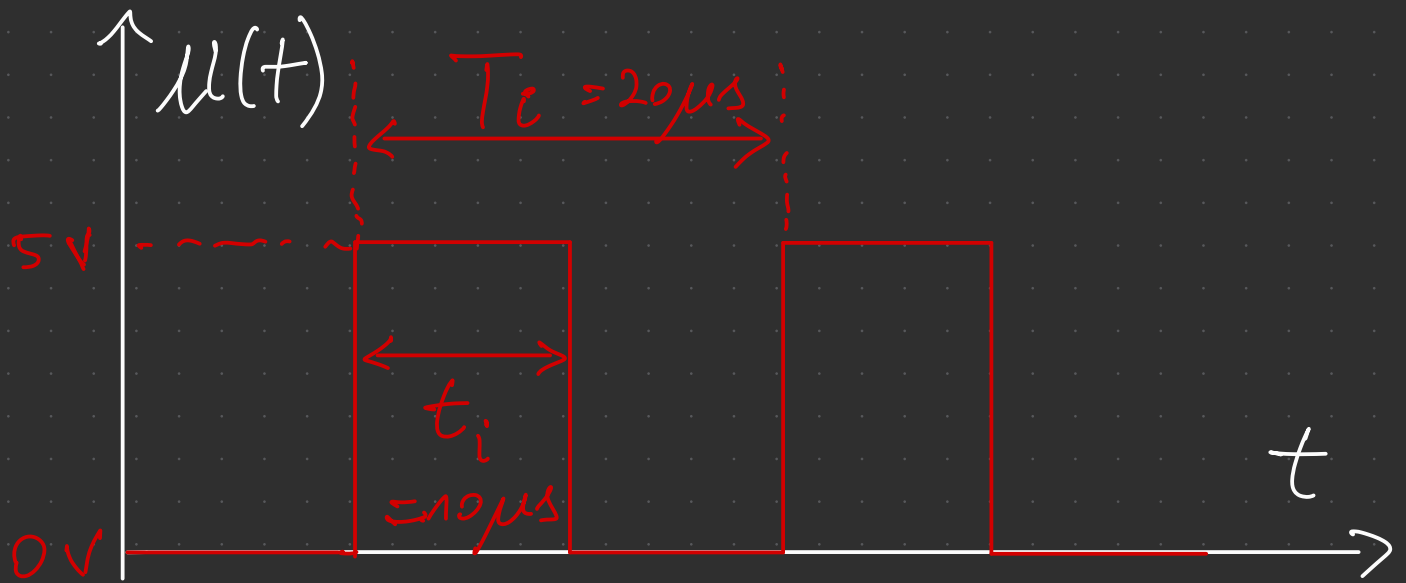
→ verificare funcția SI

③.4

→ pt. cazul $V_A = V_B = V_C = 5V$

→ se aplică la intrare un impuls cu parametrii definiți astfel

$$t_i = 10\mu s \mid V_I = 0V \mid V_S = 5V \mid T = 20\mu s$$



Obs. → vizualizare semnal de la ieșirea
portii ; oscilografare

→ măsurare T_r ; T_c pt. parametrii dati

→ măs. T_r , 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

$$T_2 = R C \ln 2 \quad R_A = 13k\Omega$$

$$T_C = ?$$

$$a) C = 100pF$$

$$T = 25\mu s \quad (5 \text{ div} \cdot 5\mu s)$$

$$t_i = 10\mu s \quad (2 \text{ div} \cdot 5\mu s)$$

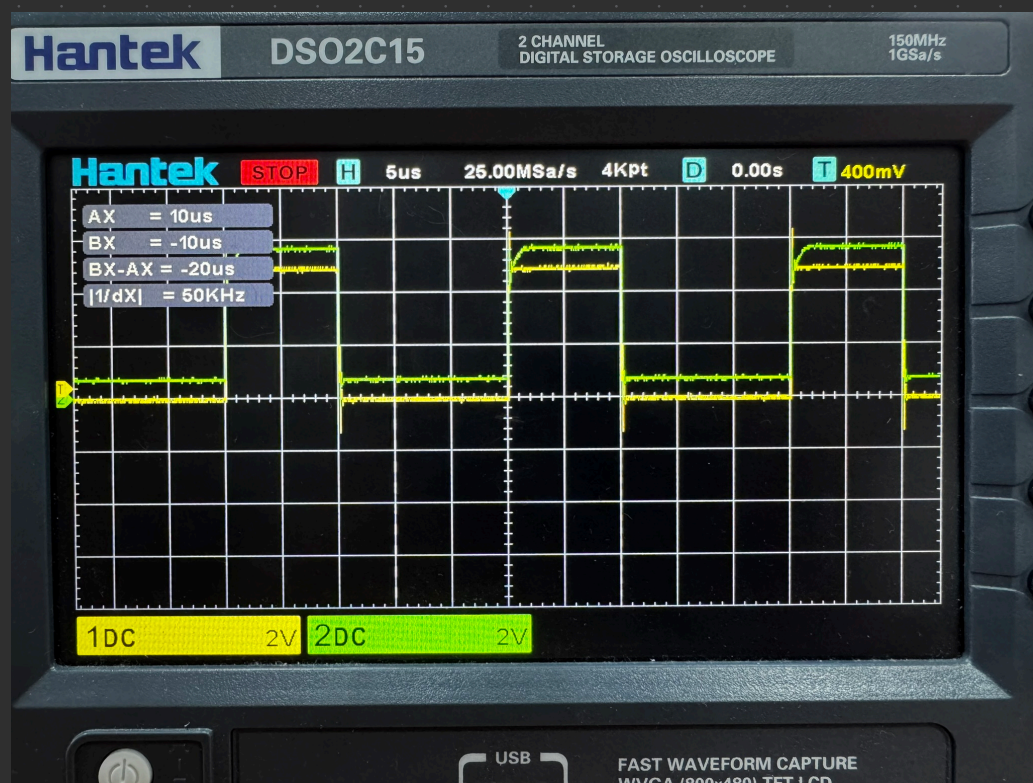
$$T_2 = 13 \cdot 10^3 \cdot 100 \cdot 10^{-12} \ln 2$$

$$= 1300 \cdot 10^{-9} \ln 2$$

$$\sim 9,01 \cdot 10^{-7} s \quad (\text{calcul}) \quad \sim 900 ns$$

$$T_2 = 900 ns \quad (\text{cursor})$$

$$t_c \sim 200 ns$$



$$b) C = 220 \text{ pF}$$

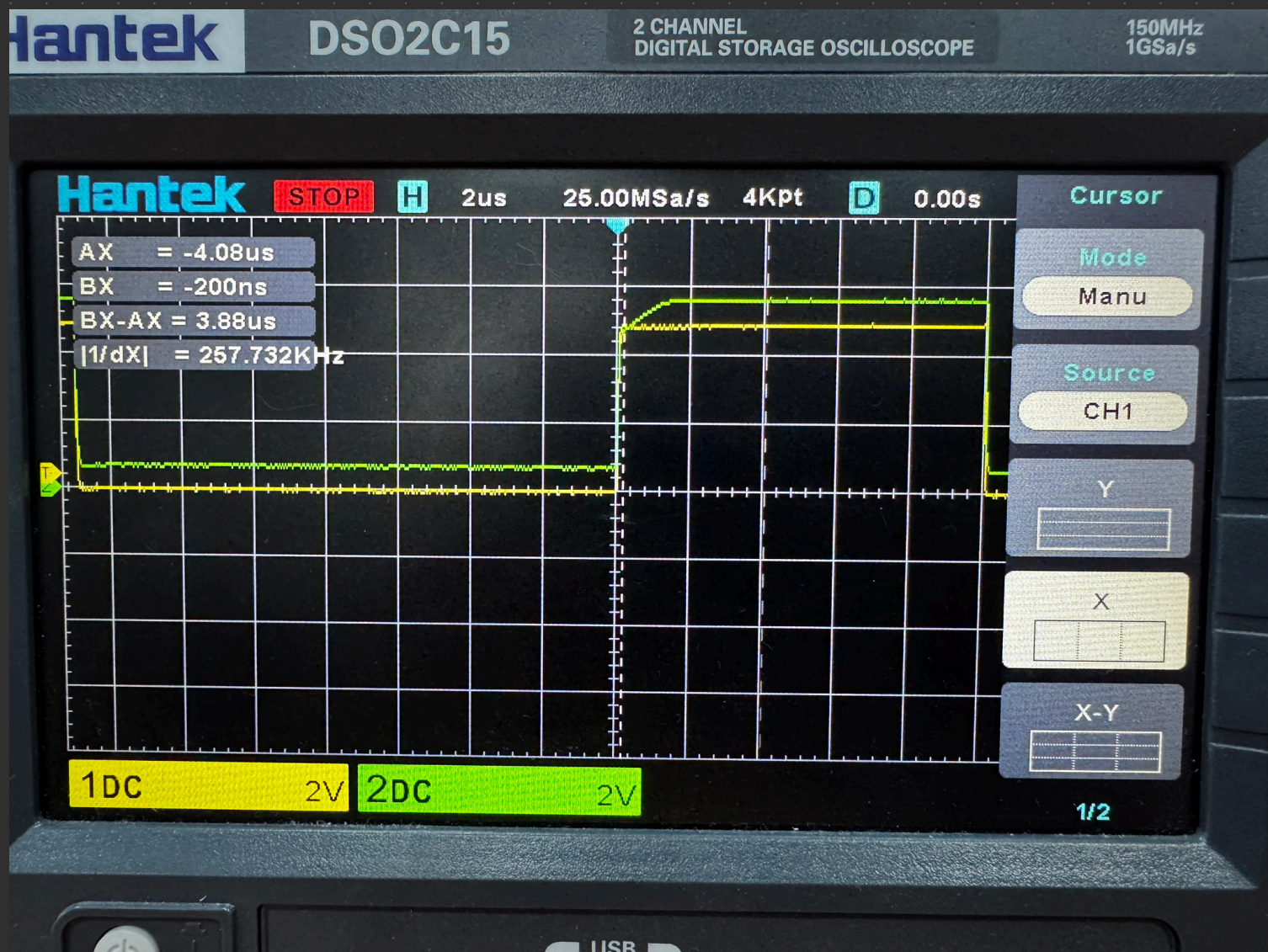
$$T_2 = RC \ln 2$$

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

$$= 1982 \text{ ns} = 1,98 \mu\text{s} \quad (\text{calcul})$$

$$T_1 = 1,12 \mu\text{s} \quad (\text{cursor})$$

$$T_C = 160 \text{ ns}$$



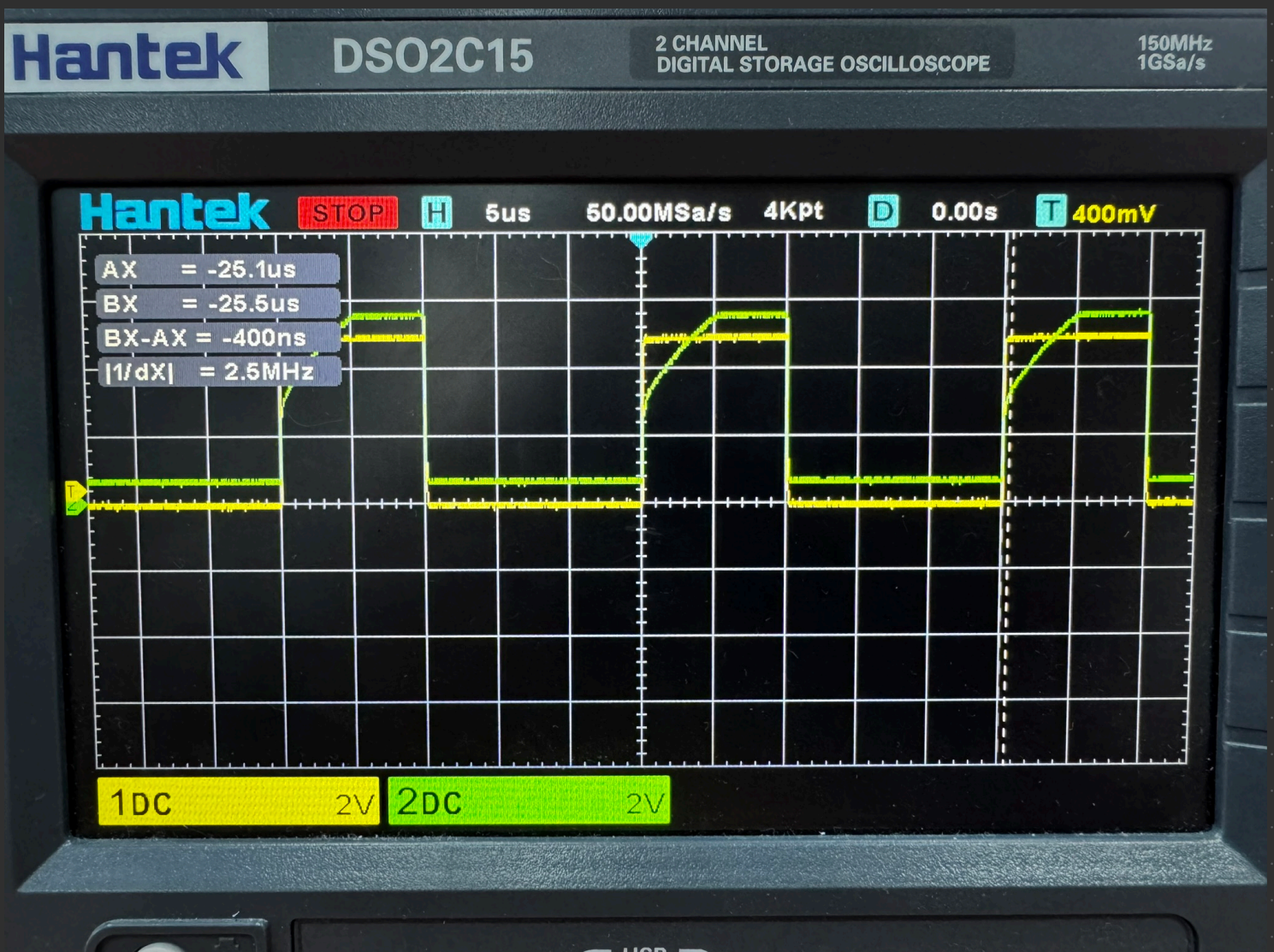
$$c) C = 470 \text{ pF}$$

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

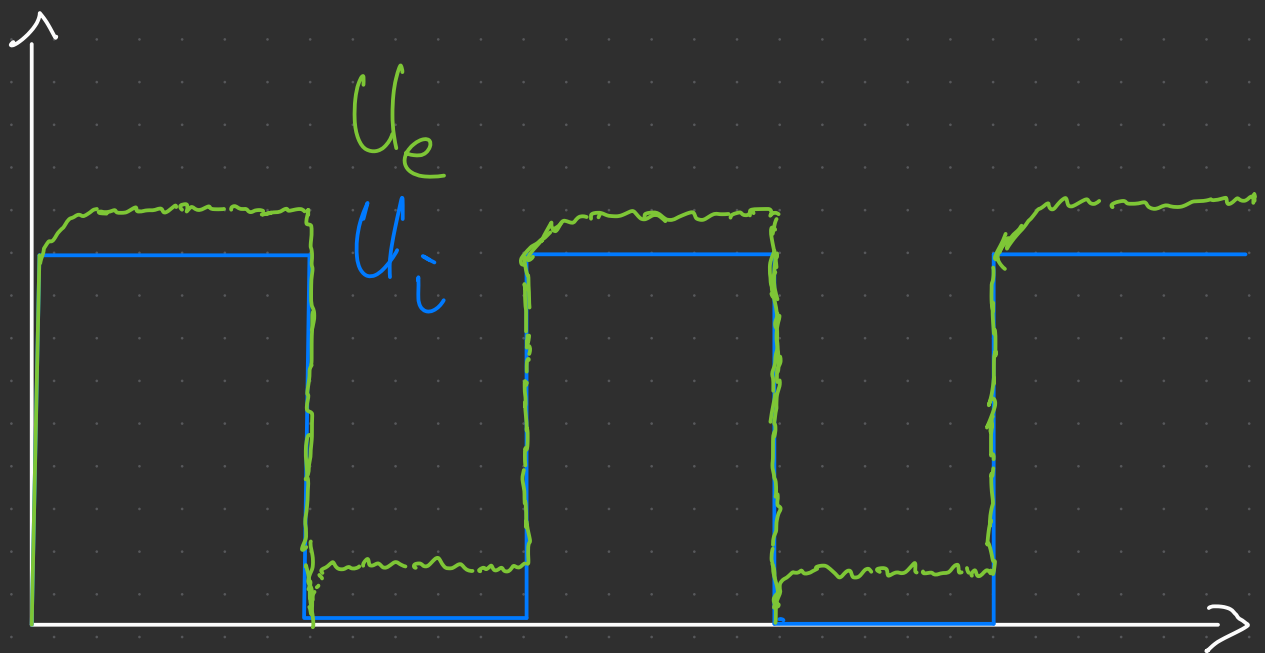
$$T_R = RC \ln 2 = 13 \cdot 10^3 \cdot 470 \cdot 10^{-12} \ln 2$$

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

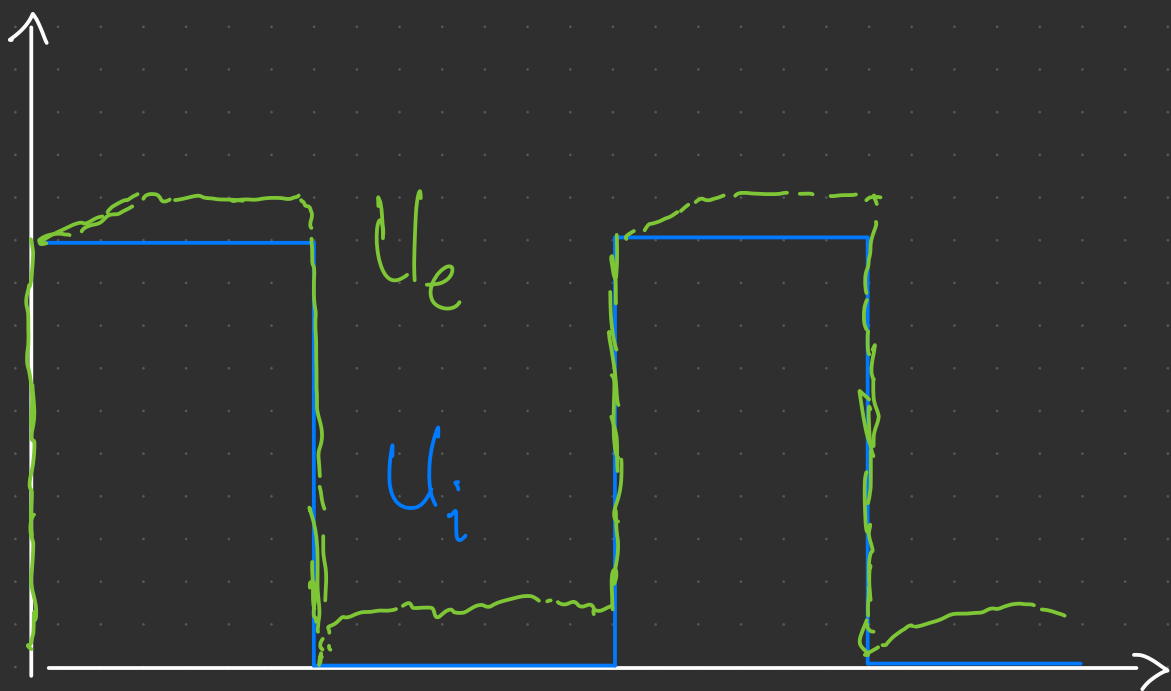
$$t_c = 200 \text{ ns}$$



a) $C = 100 \text{ pF}$



b) $C = 220 \text{ pF}$



c) $C = 470 \text{ pF}$

