

Aplicatia 3 CDCircuite logice cu diode. Parta 5iCalculul teoretic pentru timpul de ridicare:

$$t_R = R \cdot C \cdot \ln \left(\frac{V_{AA} - 0,1(V_S - V_i)}{V_{AA} - 0,9(V_S - V_i)} \right) \quad - \text{formulă pentru } t_R$$

$$V_{AA} = 15V, R = 10k\Omega, V_i = 0V, V_S = 5V$$

$$1) C = 100pF = 100 \cdot 10^{-12} F$$

$$\begin{aligned} t_R &= 10^4 \cdot 100 \cdot 10^{-12} \cdot \ln \left(\frac{15 - 0,1 \cdot 5}{15 - 0,9 \cdot 5} \right) = \\ &= 10^{-6} \cdot \ln \left(\frac{14,5}{10,5} \right) = 10^{-6} \cdot \ln(1,38) = 0,322 \cdot 10^{-6} \\ \Rightarrow t_R &= 0,322 \mu s \end{aligned}$$

$$2) C = 220pF = 220 \cdot 10^{-12} F$$

$$\begin{aligned} t_R &= 10^4 \cdot 220 \cdot 10^{-12} \cdot 0,322 = 22 \cdot 0,322 \cdot 10^{-7} \Rightarrow \\ \Rightarrow t_R &= 7,084 \cdot 10^{-7} = 0,7084 \mu s \end{aligned}$$

$$3) C = 470pF = 470 \cdot 10^{-12} F$$

$$\begin{aligned} t_R &= 10^4 \cdot 470 \cdot 10^{-12} \cdot 0,322 = 151,34 \cdot 10^{-8} = \\ &= 1,5134 \cdot 10^{-6} = 1,5134 \mu s \end{aligned}$$

$$4) C = 1nF = 10^{-9} F$$

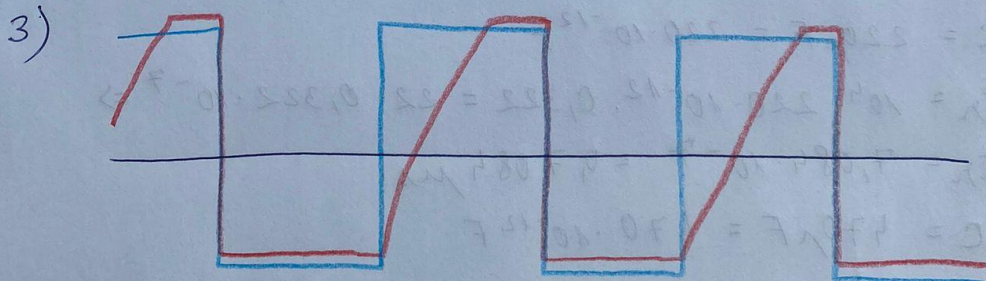
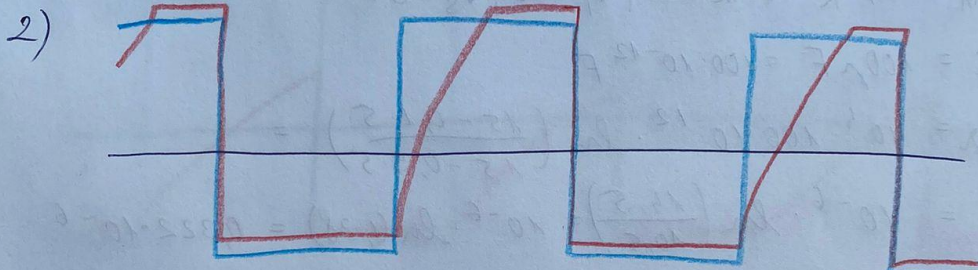
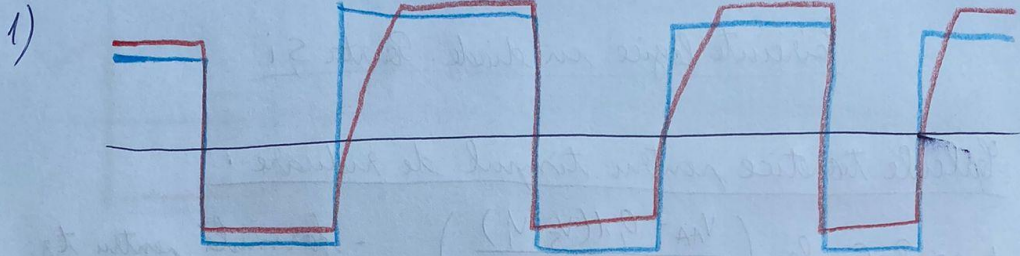
$$t_R = 10^4 \cdot 10^{-9} \cdot 0,322 = 0,322 \cdot 10^{-5} = 3,22 \mu s$$

$$5) C = 1,5nF = 1,5 \cdot 10^{-9} F$$

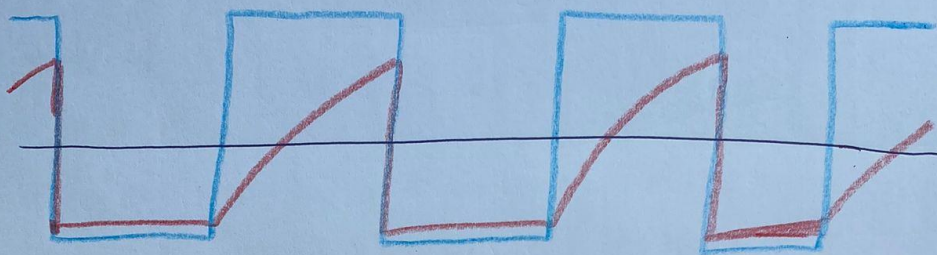
$$t_R = 10^4 \cdot 1,5 \cdot 10^{-9} \cdot 0,322 = 0,483 \cdot 10^{-5} = 4,83 \mu s$$

(1)

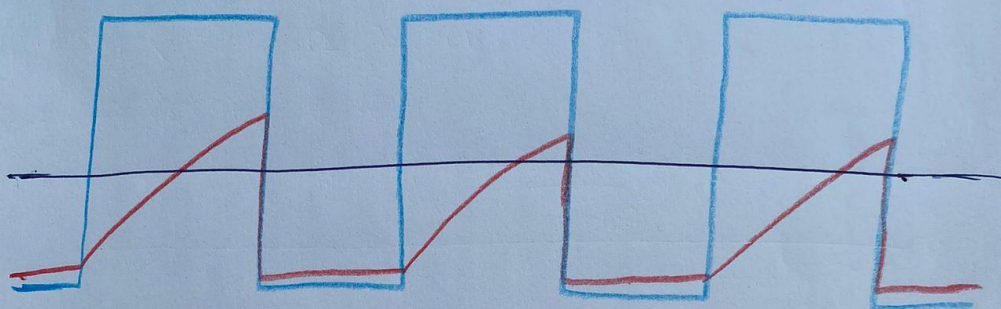
Diagramme de temps :



4)

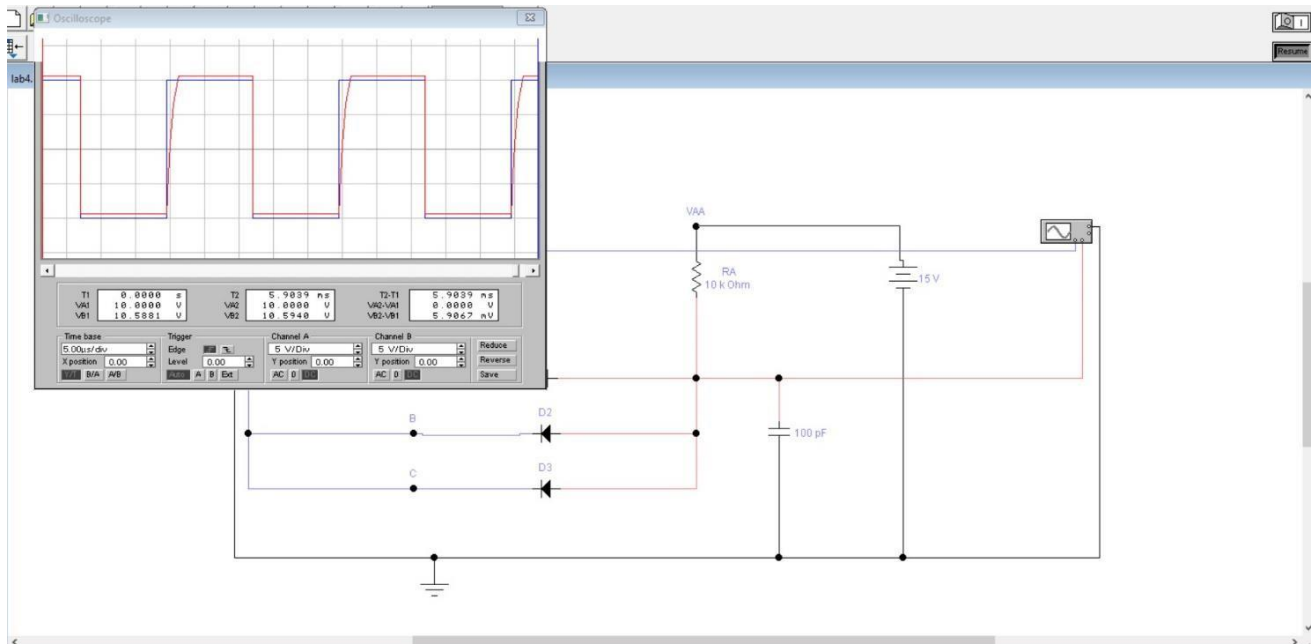


5)

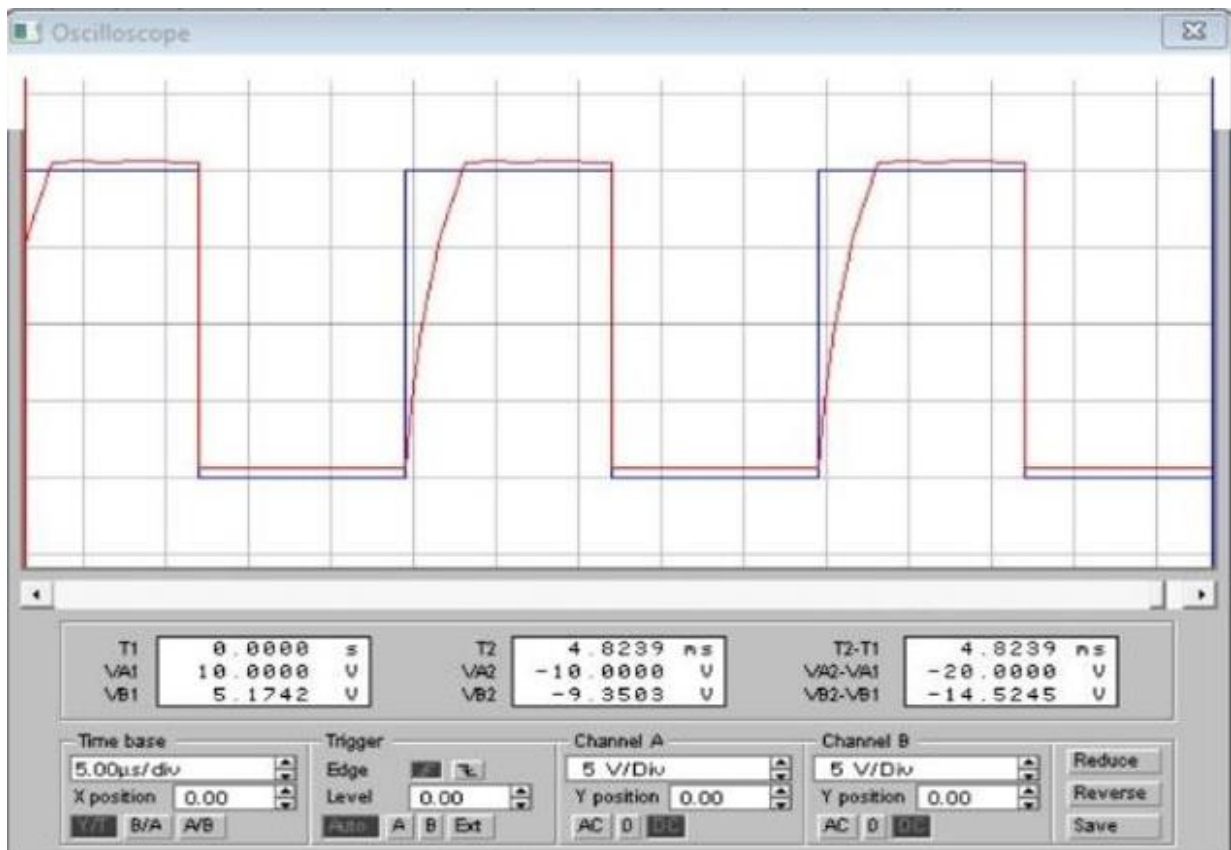


Masuratori simulate :

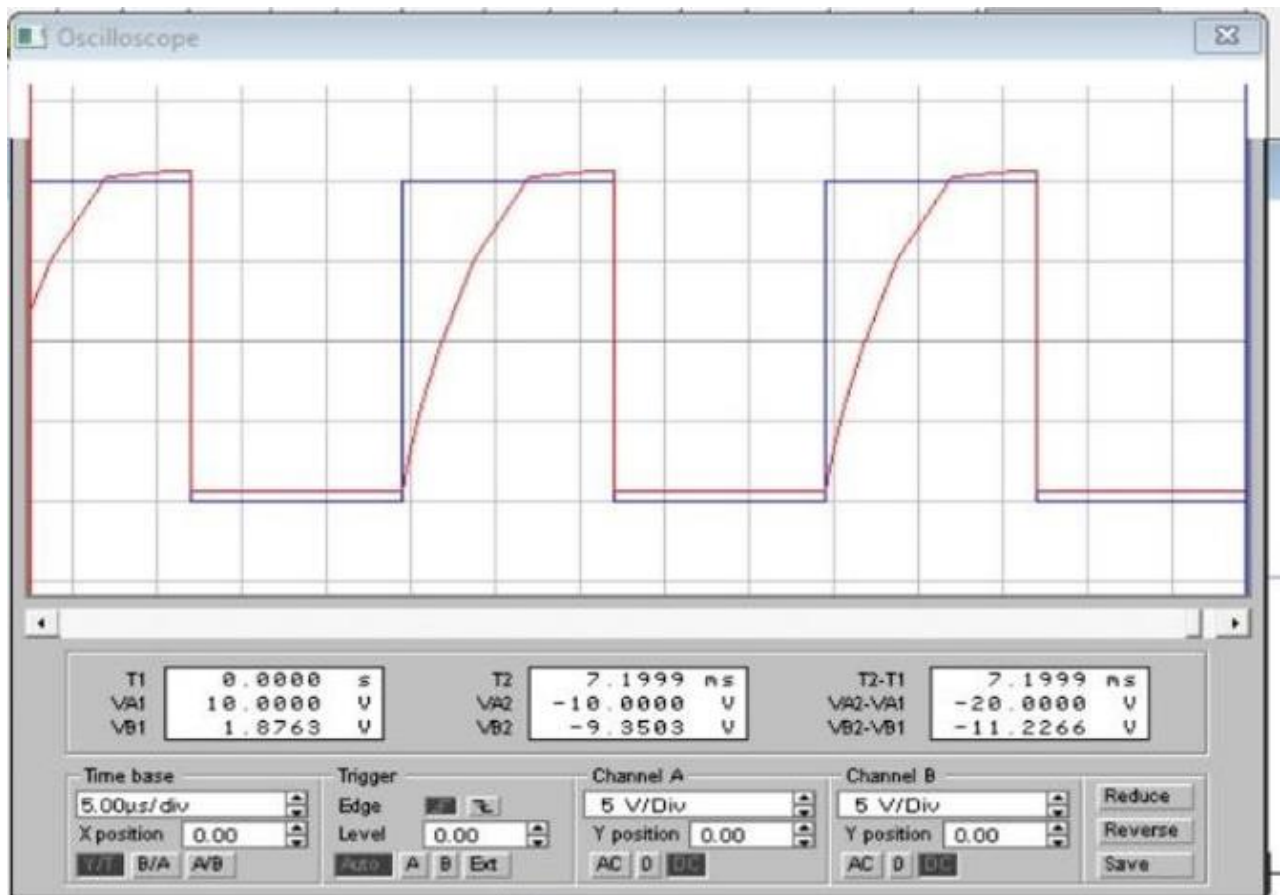
1) $C = 100 \text{ pF}$



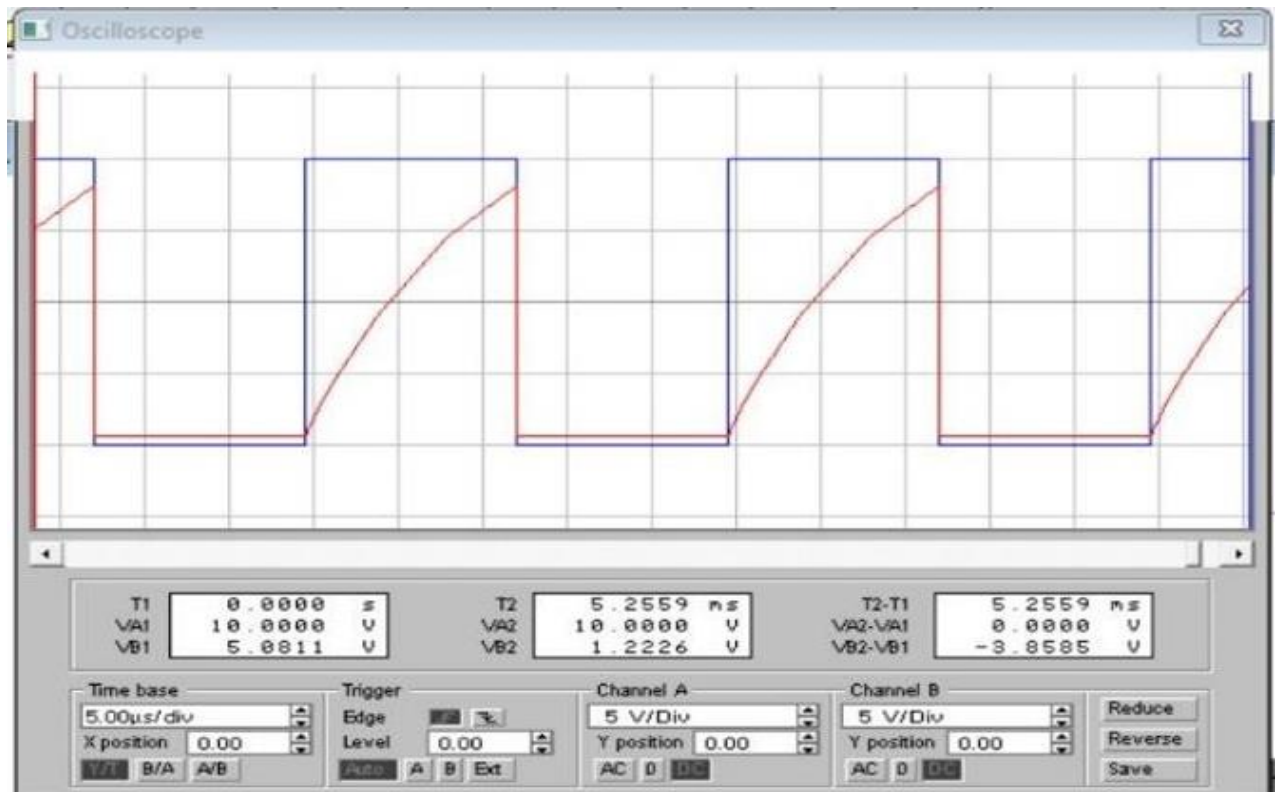
2) $C = 220 \text{ pF}$



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



4) $C = 1 \text{ nF}$



5) $C = 1.5 \text{ nF}$

