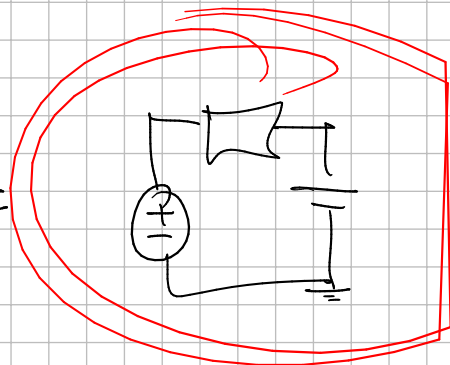
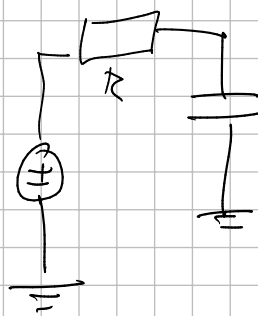
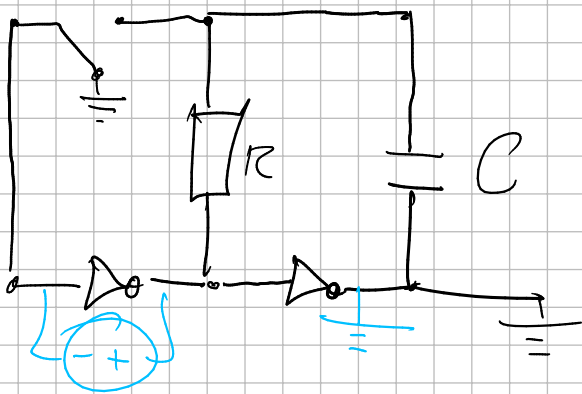
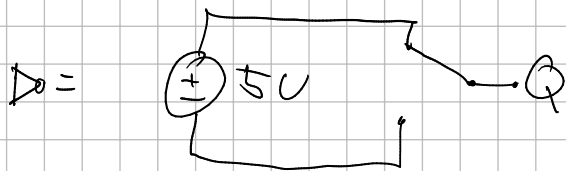
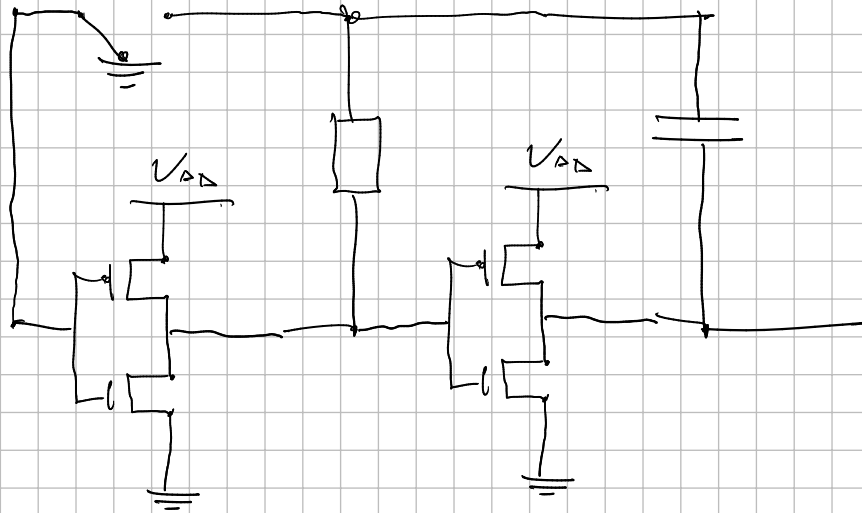
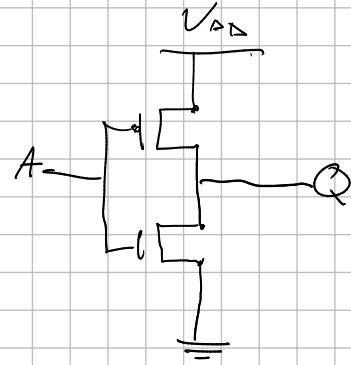
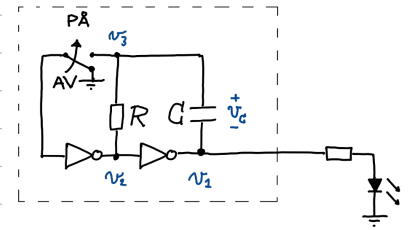
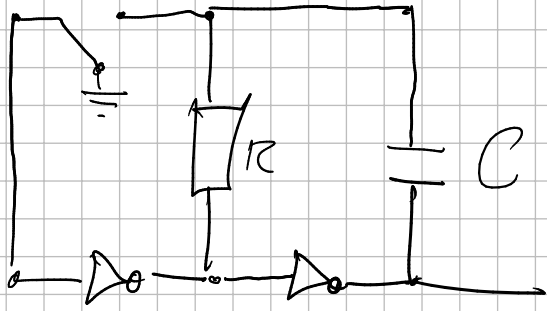
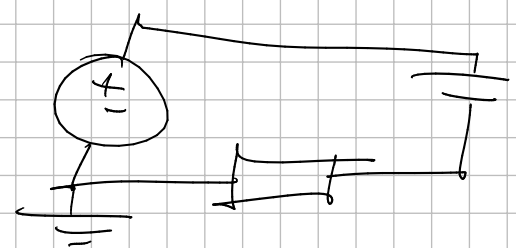
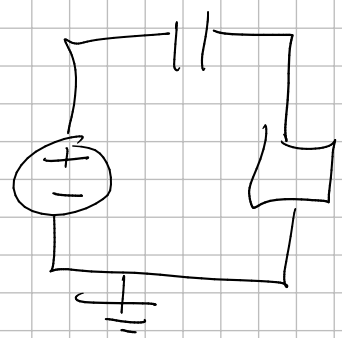
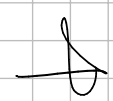
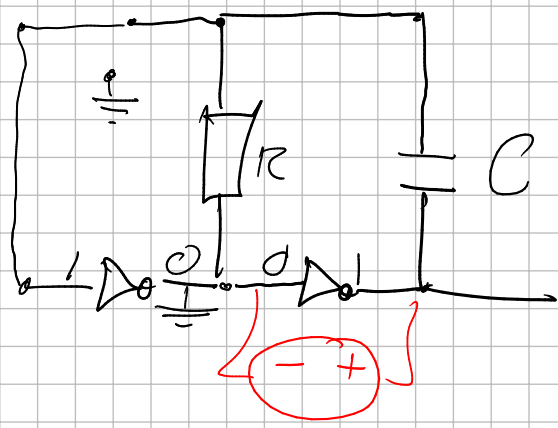


ERT 21

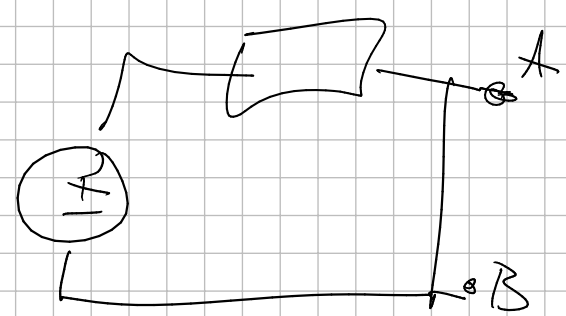
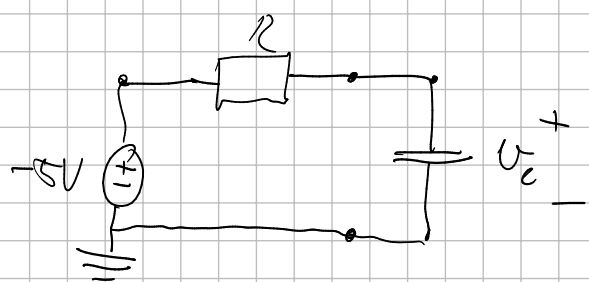
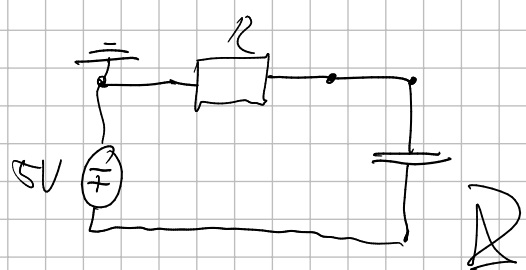
01/10/21



Opp 5



Opp 6)



Opf. 9 a) $i(t) = C \frac{d}{dt} u_c(t)$

$$U = U_R + U_C$$

$$U = R \cdot i + U_C$$

$$U = R C \frac{d}{dt} u_c(t) + u_c(t)$$

$$\frac{d}{dt} u_c + \frac{1}{RC} u_c(t) = \frac{1}{RC} U \quad \lambda = \frac{1}{RC}$$

$$\frac{d}{dt} u_c + \lambda u_c(t) = \lambda U \quad \int_0^\infty e^{\lambda \tau}$$

$$\frac{d}{dt} (u_c e^{\lambda t}) = \lambda U e^{\lambda t} \quad \int_0^\infty d\tau$$

$$u_c e^{\lambda t} = U e^{\lambda t} + D \quad | \cdot e^{-\lambda t}$$

$$u_c(t) = U + D e^{-\lambda t}$$

$$u_c(0) = 0$$

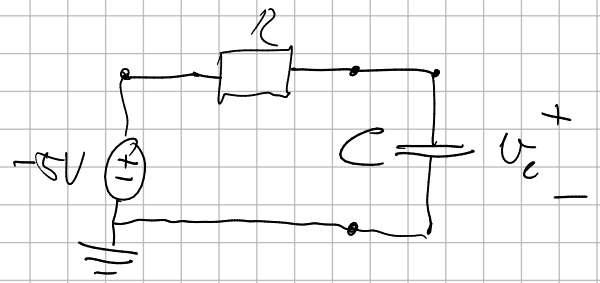
$$U + D = 0$$

$$D = -U$$

$$u_c(t) = U - U e^{-\frac{1}{RC} t}$$

$$u_c(t) = U (1 - e^{-\frac{1}{RC} t})$$

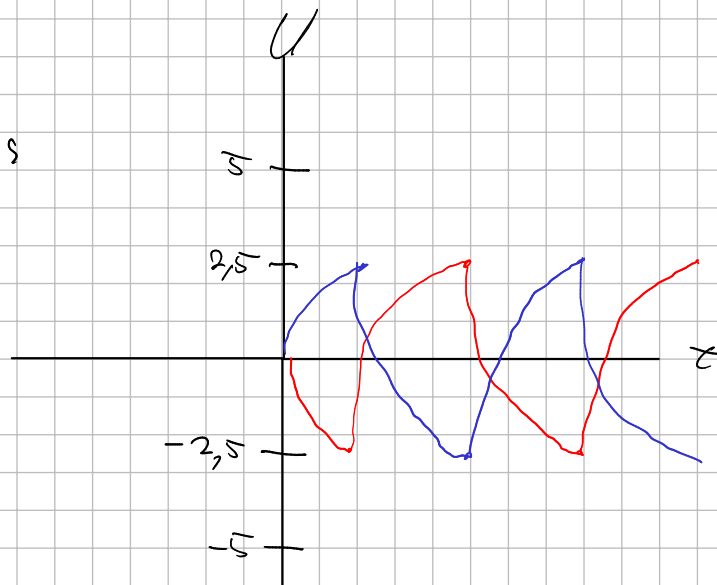
$$u_c(\tau) = -5 (1 - e^{-\frac{1}{RC} \tau})$$



Opf. 9 b)

2,5V er CMOS

Threshold



Opz 11

$$T_n = 2 \ln(3) \tau \Rightarrow \tau = \frac{1}{2 \ln(3)} T = \tau$$

$$\tau = RC$$

$$\frac{1}{2 \ln(3)} T = RC$$

$$C = \frac{1}{2 \ln(3)} T \cdot \frac{1}{R}$$

$$C = \frac{1}{2 \ln(3)} \cdot 10^{-3} \cdot \frac{1}{830}$$

$$C = 1,5 \cdot 10^{-6}$$

