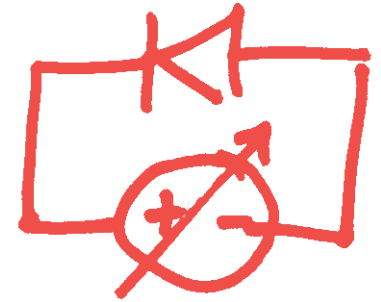
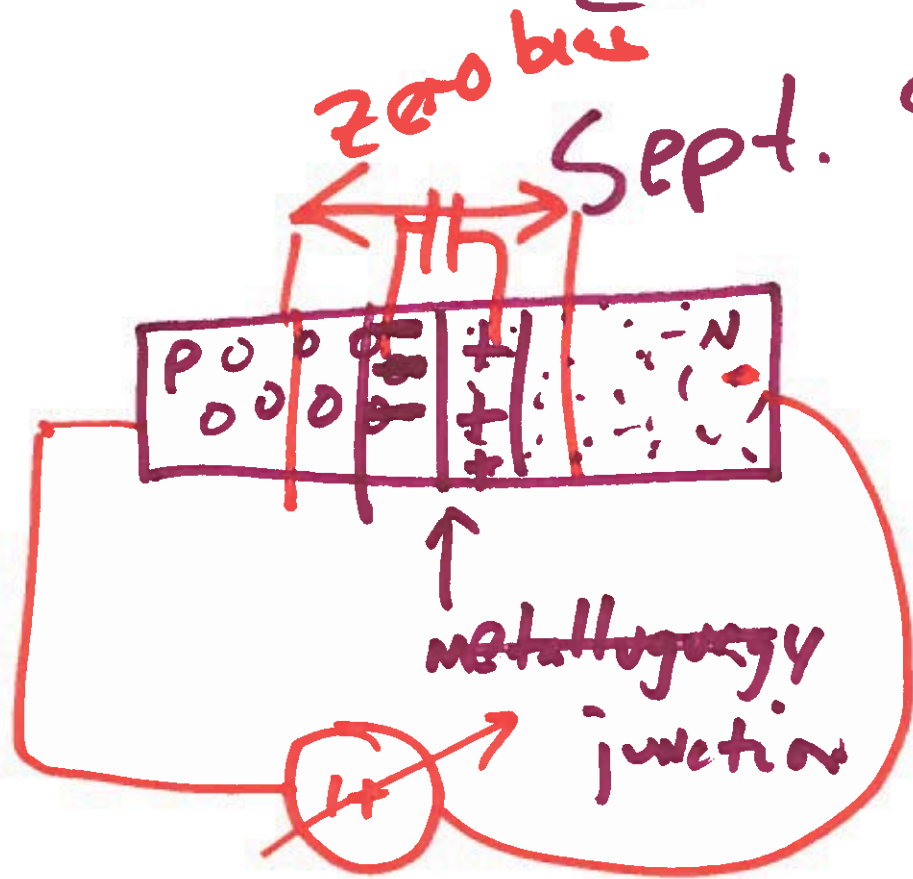


EE421/ECG-621

Digital IC Design

Lecture 4

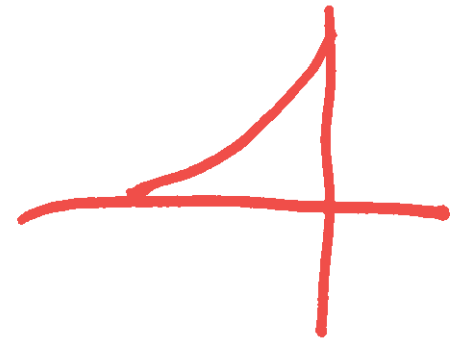
Sept. 9, 2019



up-front

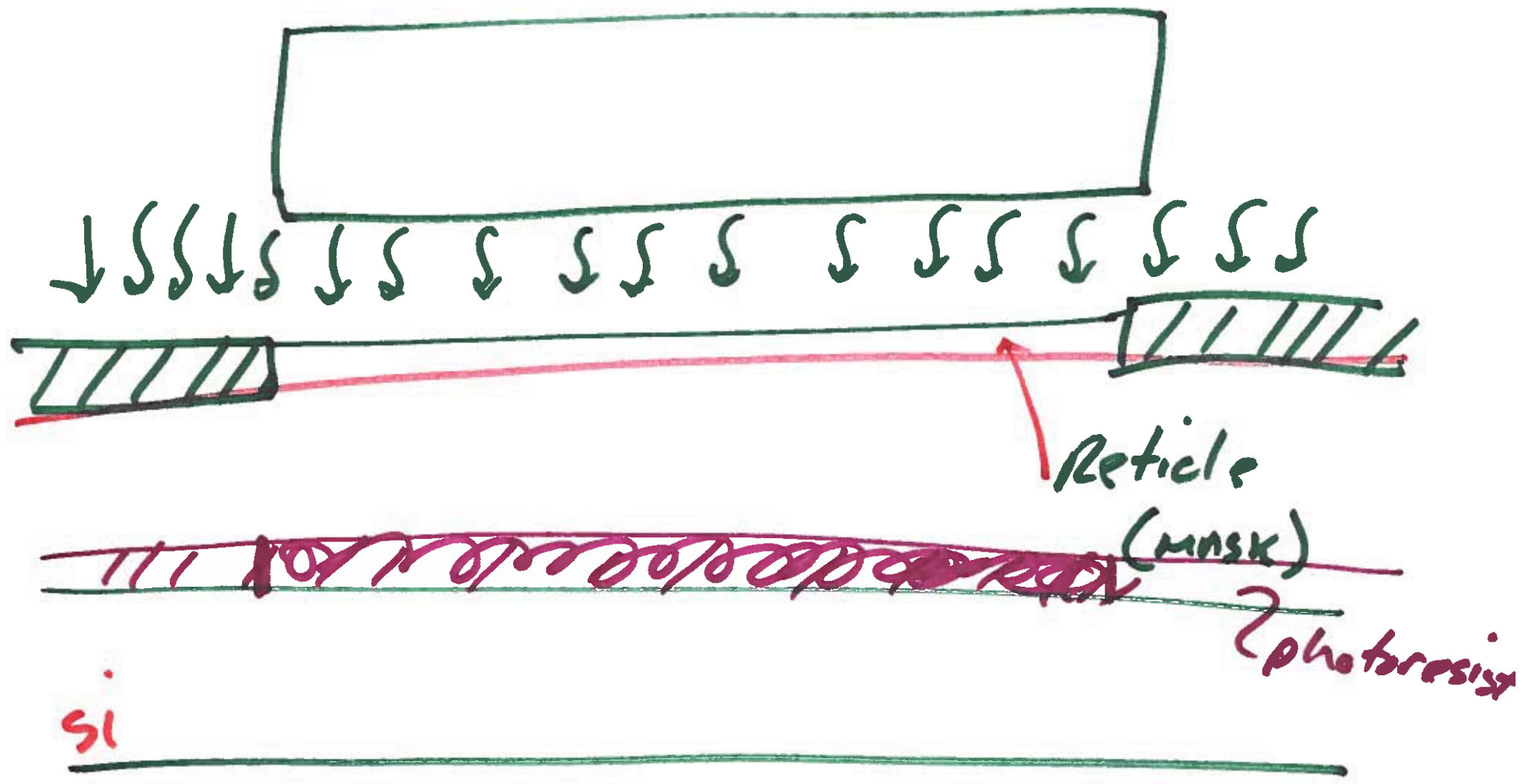
3-chickens

$$C = \frac{\epsilon A}{t}$$

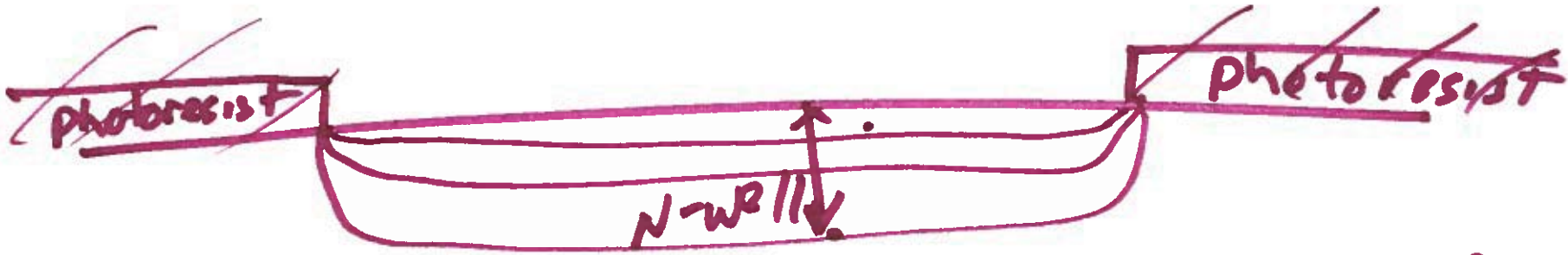
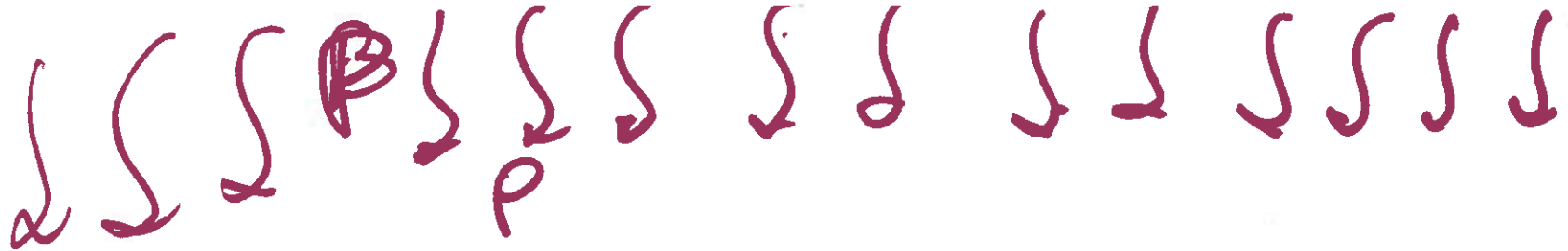


1)

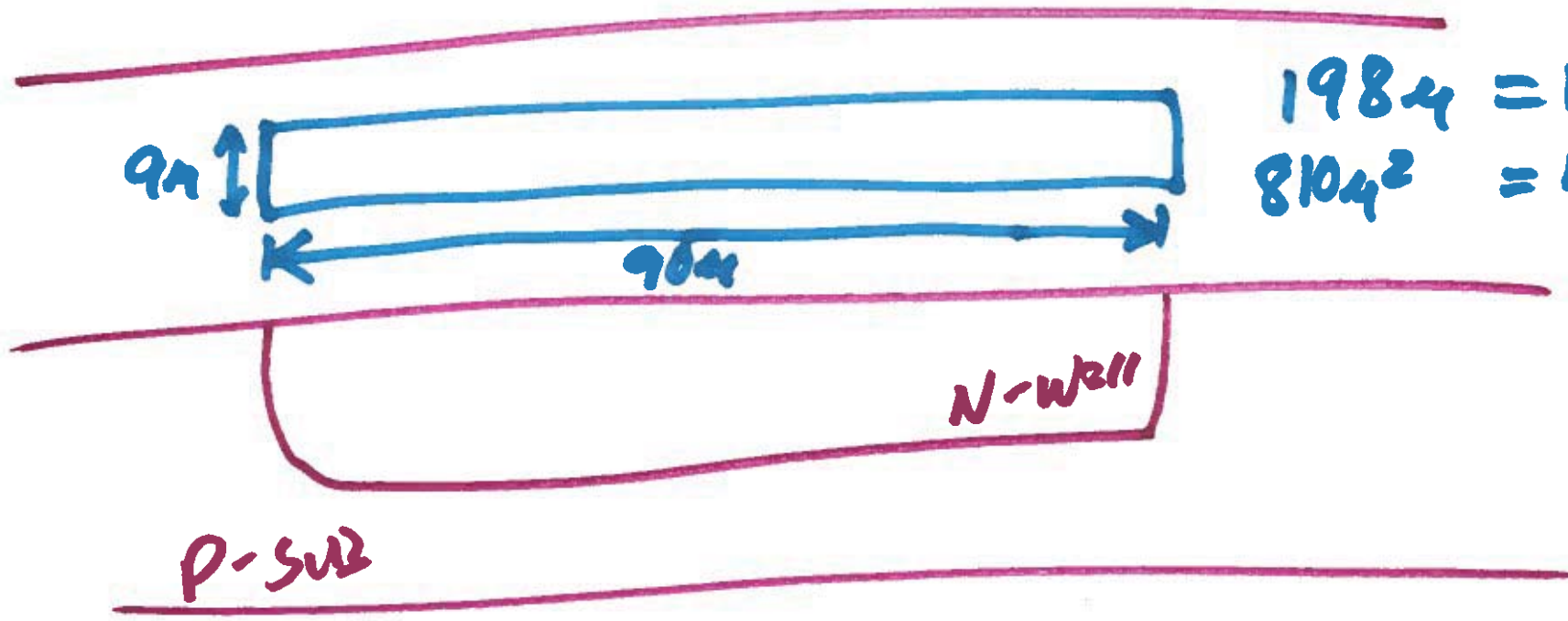
N-well



2)



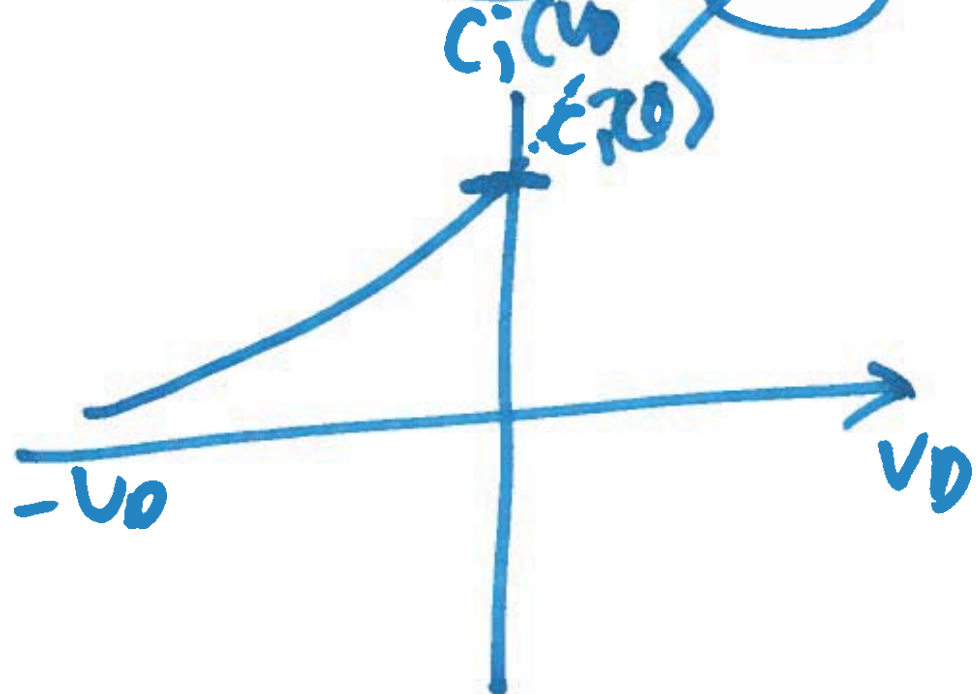
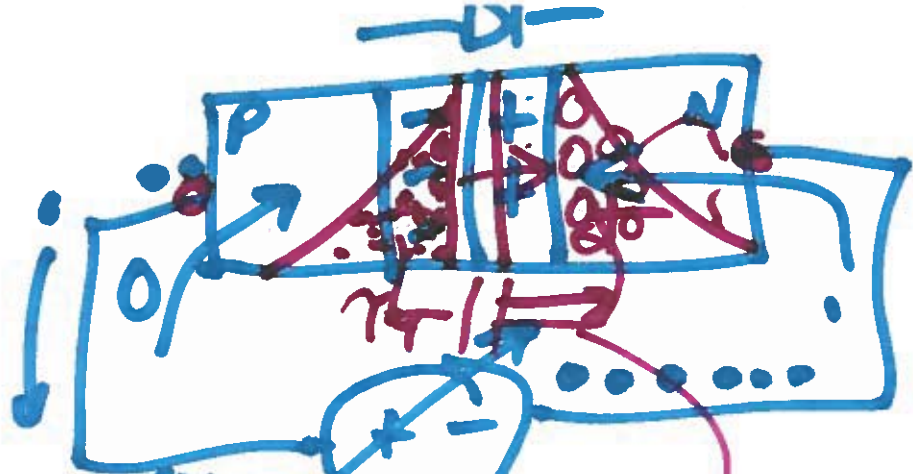
P-SUB



1984 = P
81042 = A

P-SUB

3)



$$T_L = 10^{-4} \text{ s}$$

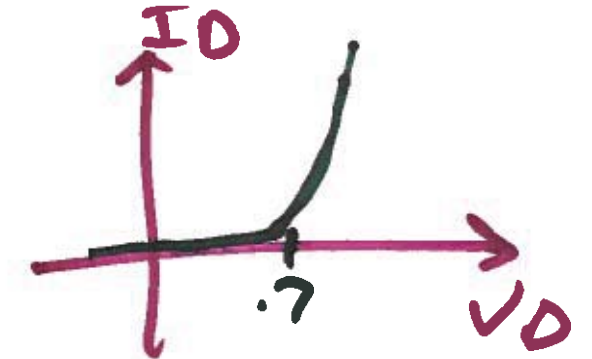
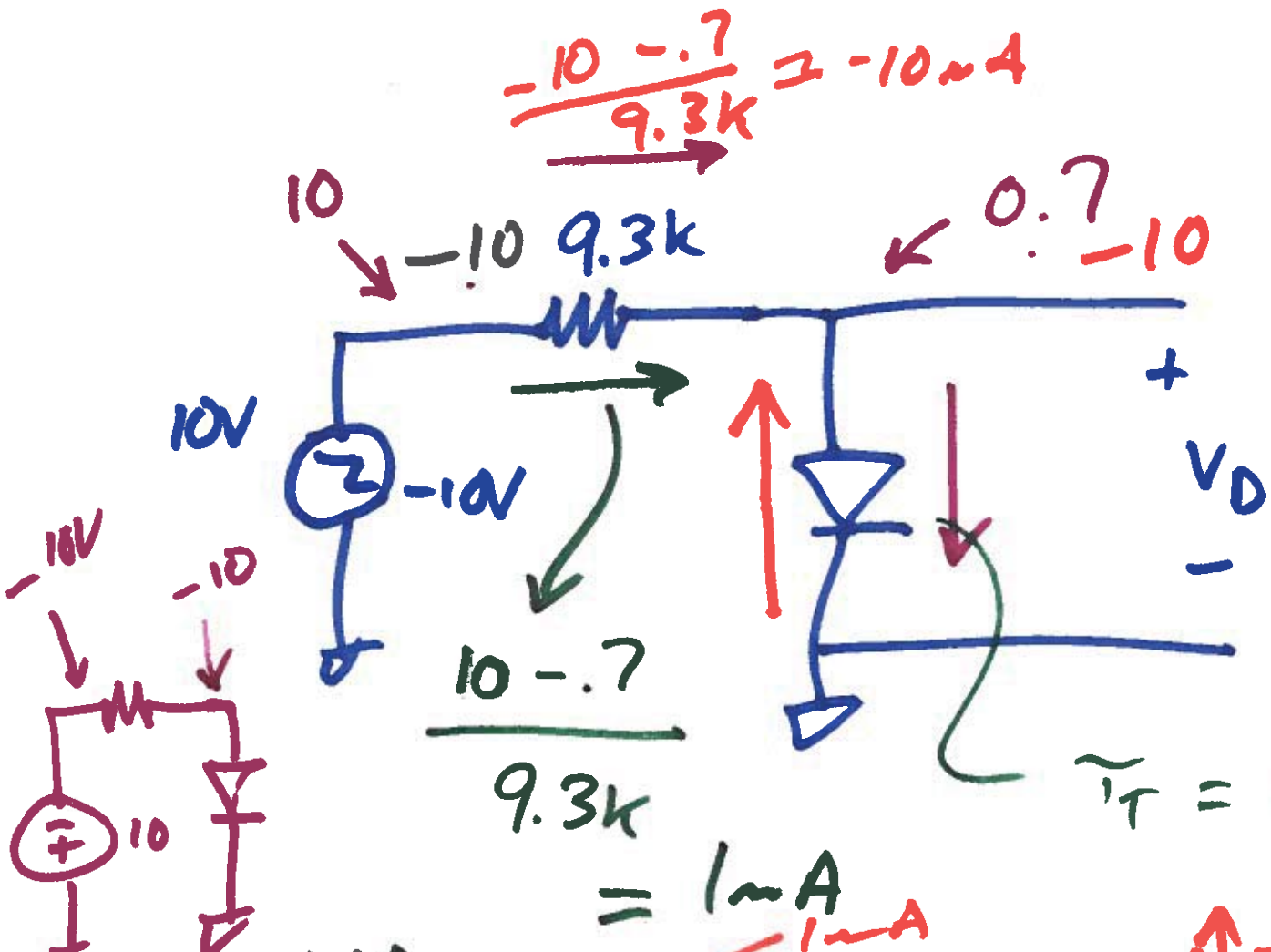
diffusion capacitance

$$C_d = T_T \cdot \frac{I_D}{V_T}$$

$$V_T = \frac{kT}{q} \quad C_d = \frac{10 \mu\text{A}}{25 \text{ mV}}$$

$$C_d = 10 \mu\text{F}$$

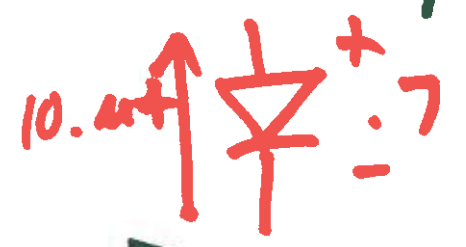
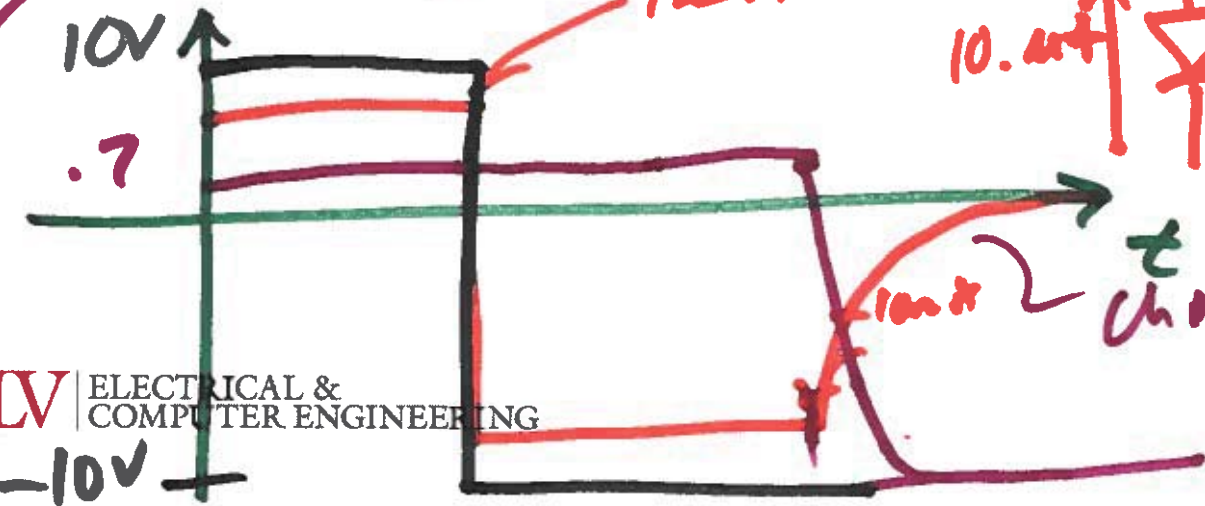
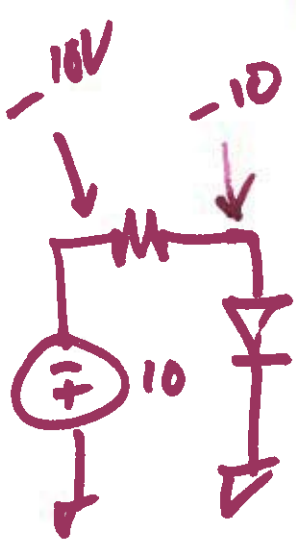
4)



$$C_D = \tau_T \cdot \frac{I_D}{V}$$

$$\tau_T = 10\text{ns}$$

$$= 10\text{ns} \cdot \frac{10\mu\text{A}}{2\text{mV}} = 400\text{pF}$$



5)