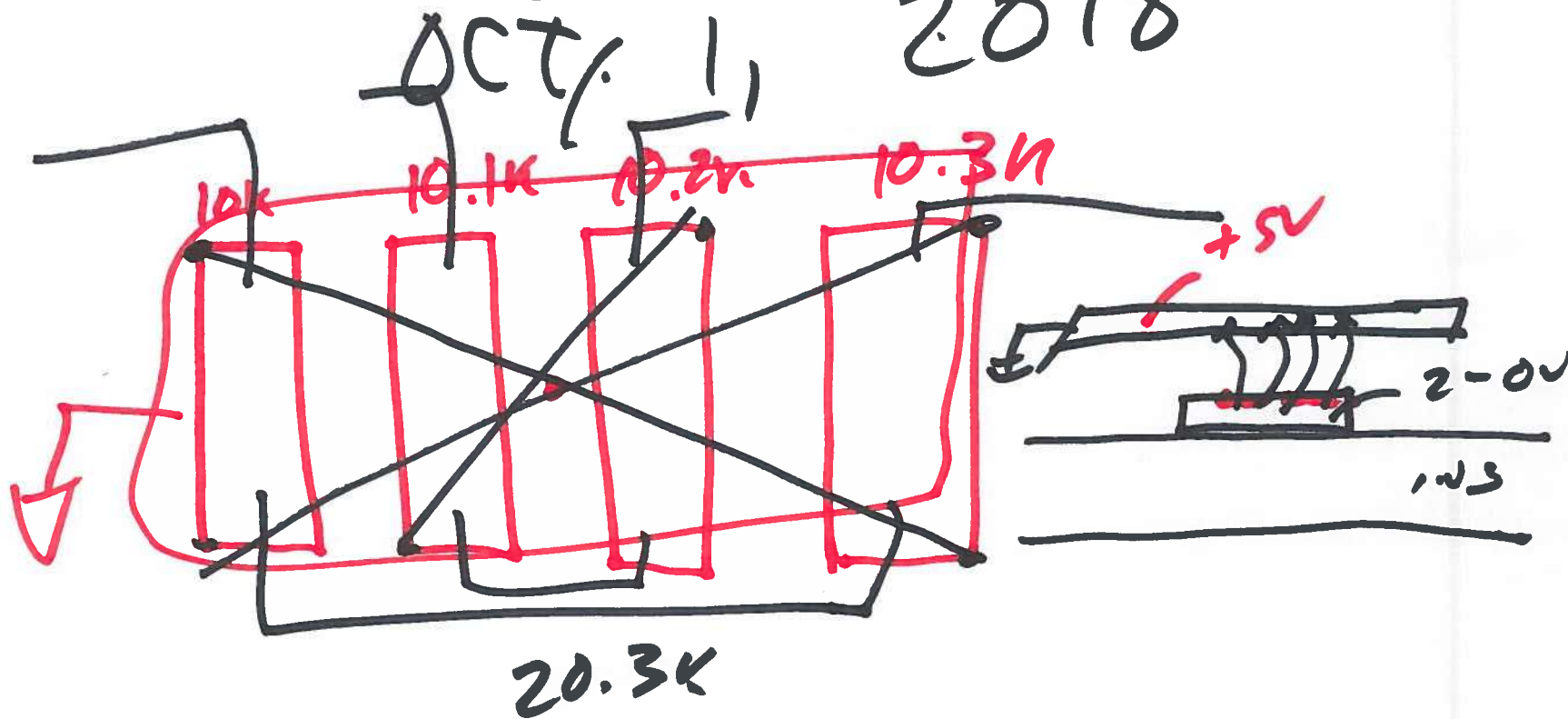
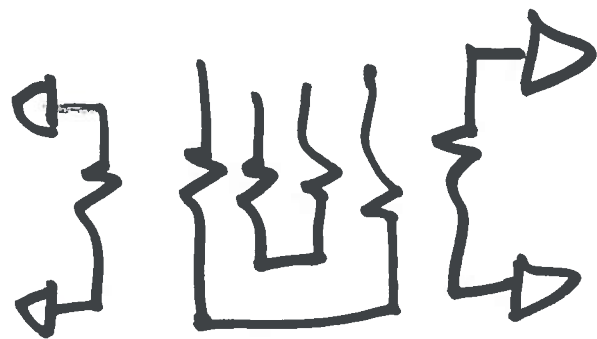


EE421 / ECG 621

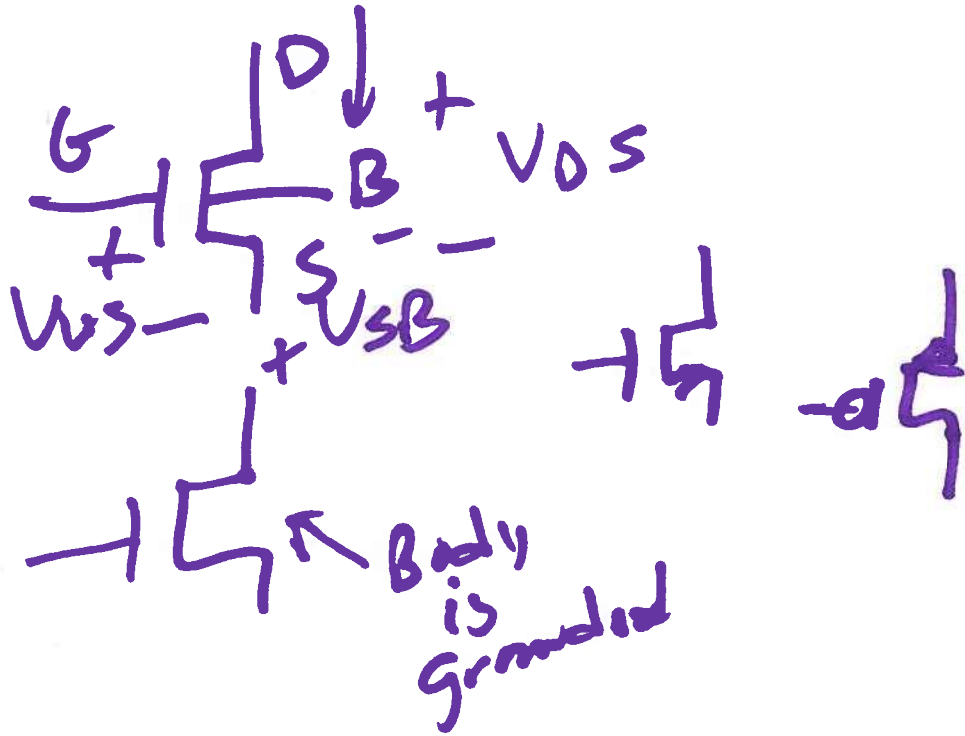
Digital IC Design

20.3k Lecture 11

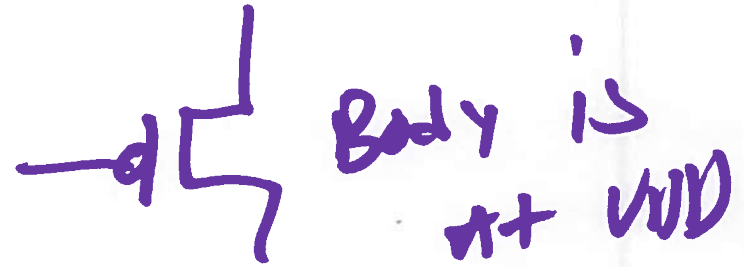
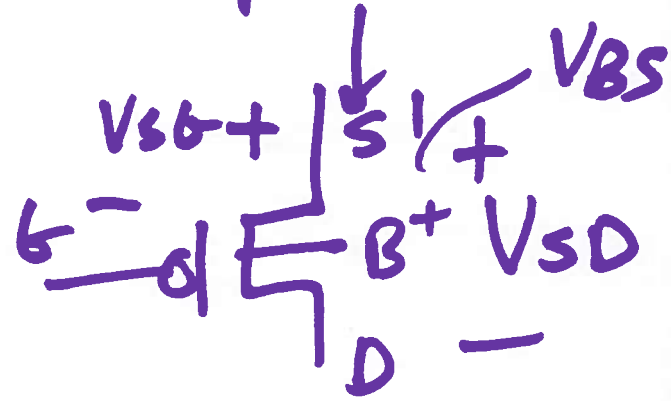
2018



NMOS

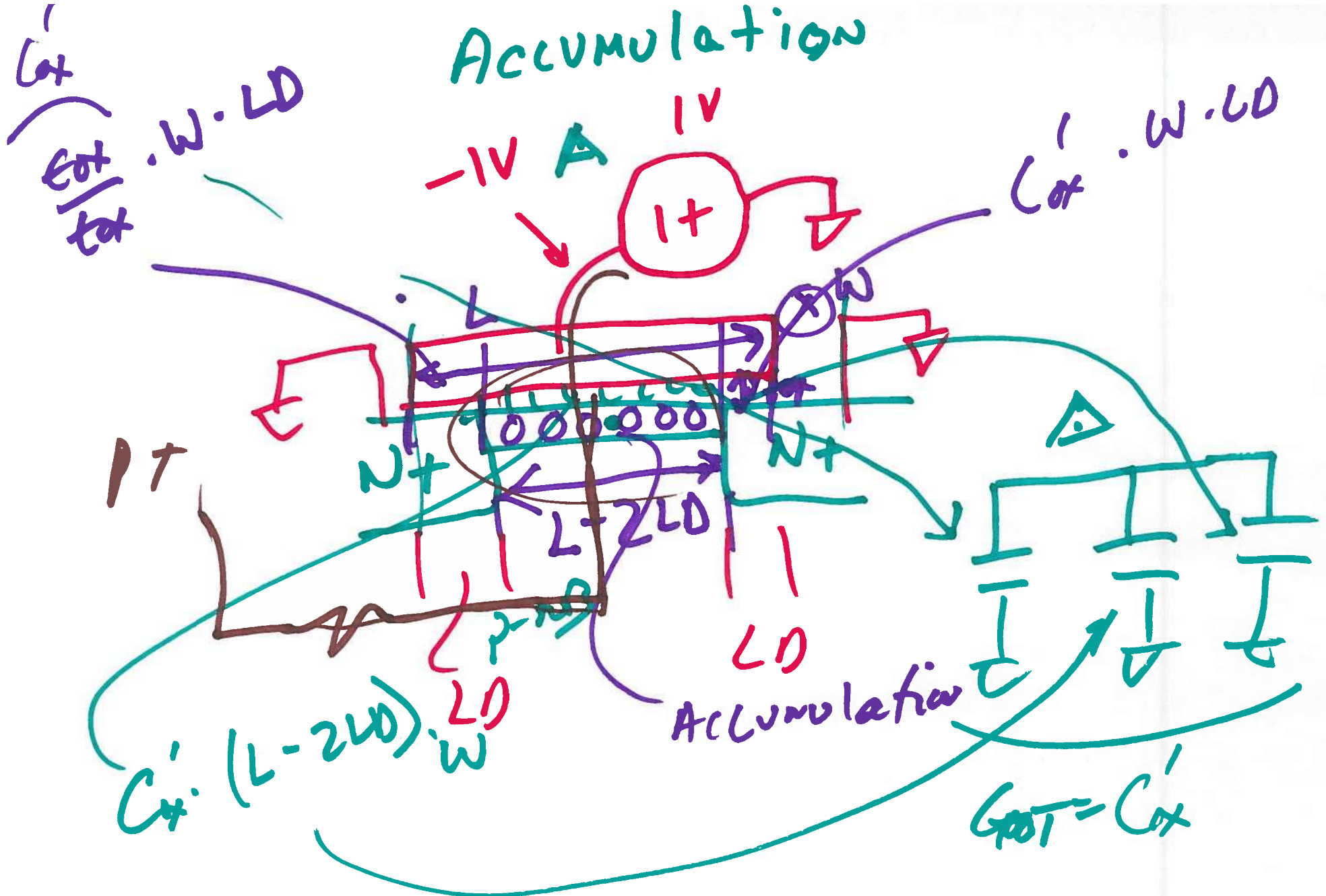


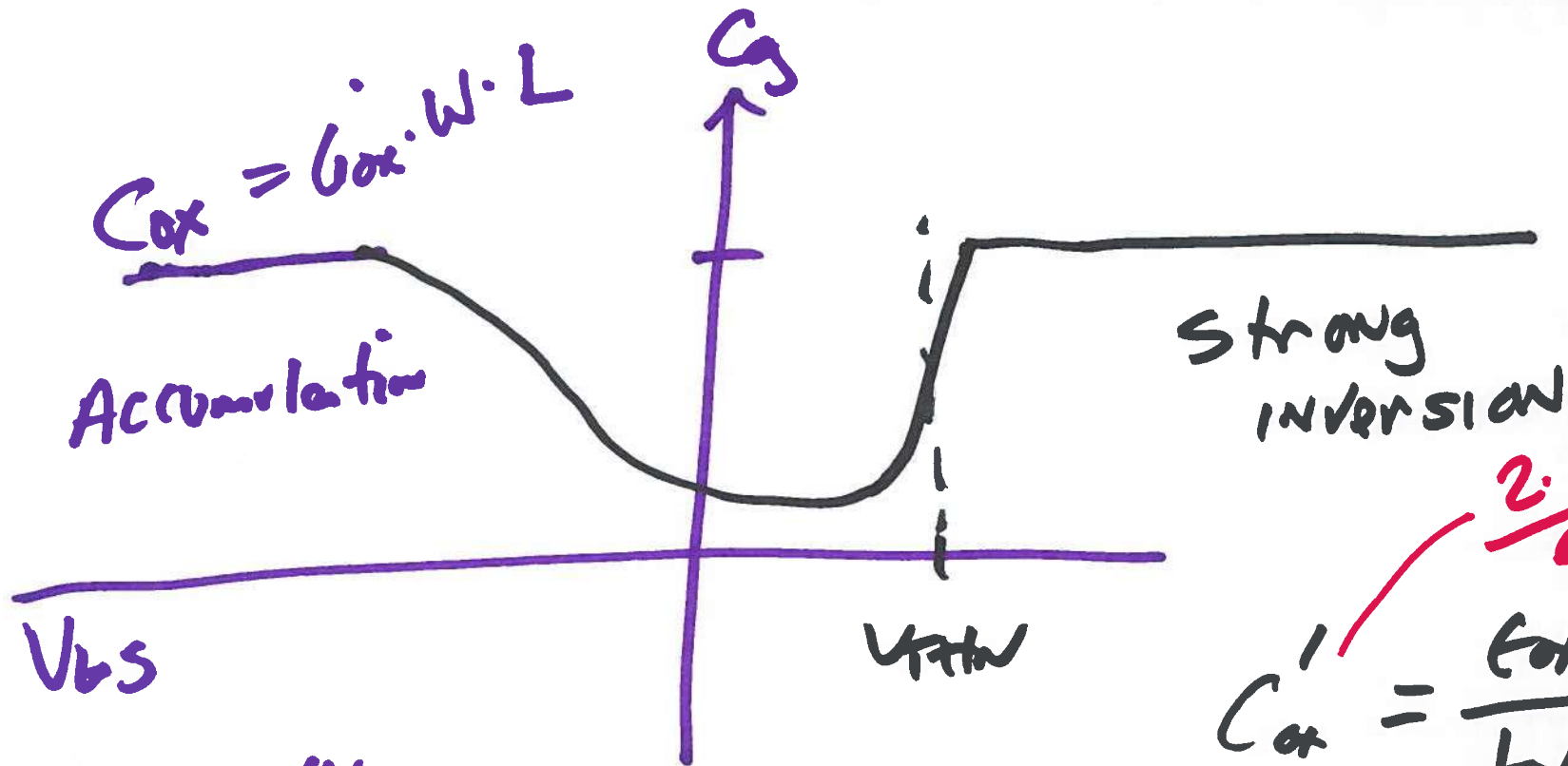
PMOS



2)

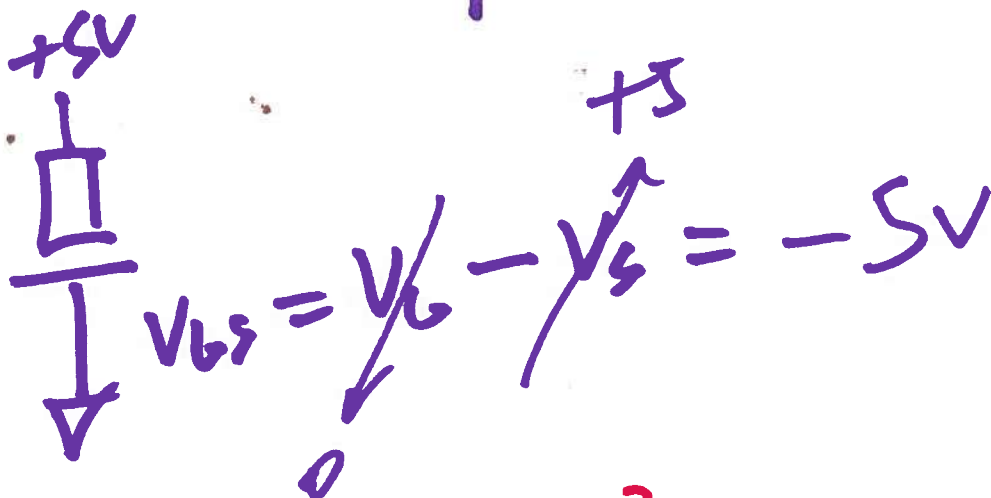
Accumulation





$C'_{ox} = \frac{\epsilon_{ox}}{t_{ox}} = \frac{2.5 \text{ pF}}{4 \mu\text{m}^2} \text{ of } \frac{3.9 \cdot 8.85}{0.0134}$

C5



$\epsilon_{ox} = 3.9$

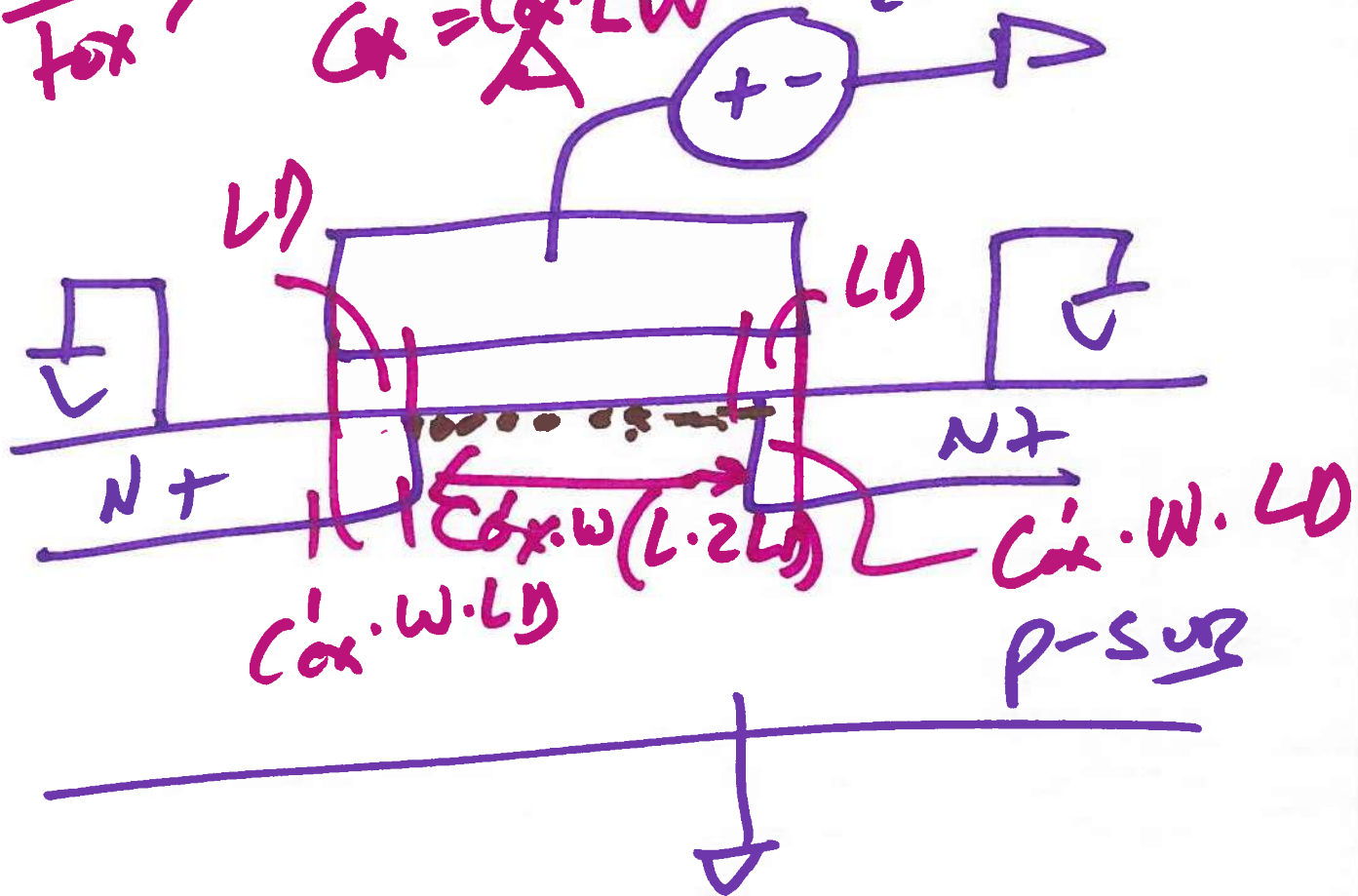
$\epsilon_0 = 8.85 \times 10^{-18} \text{ F}$

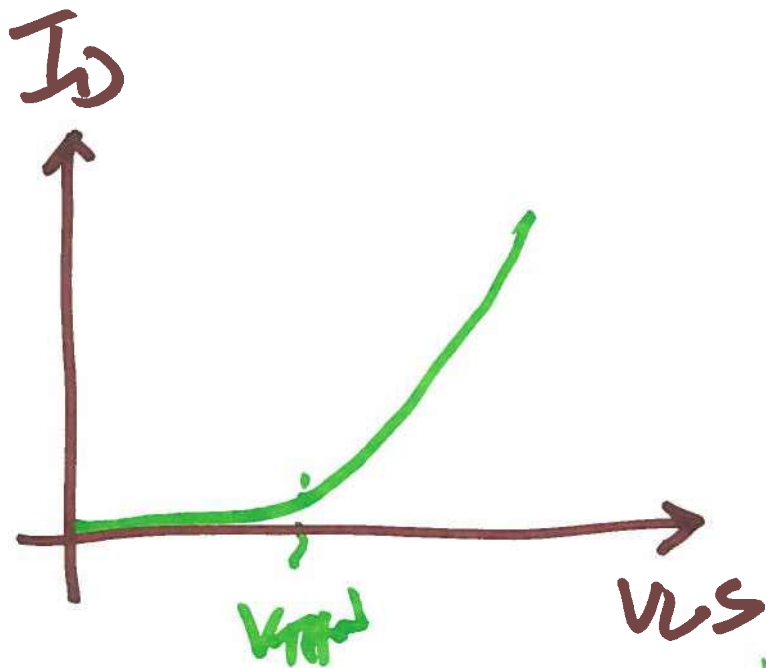
$4 \mu\text{m}^2 = 4 \mu\text{m} \cdot 4 \mu\text{m} = 10^{-12} \text{ m}^2$

4)

$$C_{ox} \cdot \frac{t_{ox}}{t_{ox}}$$

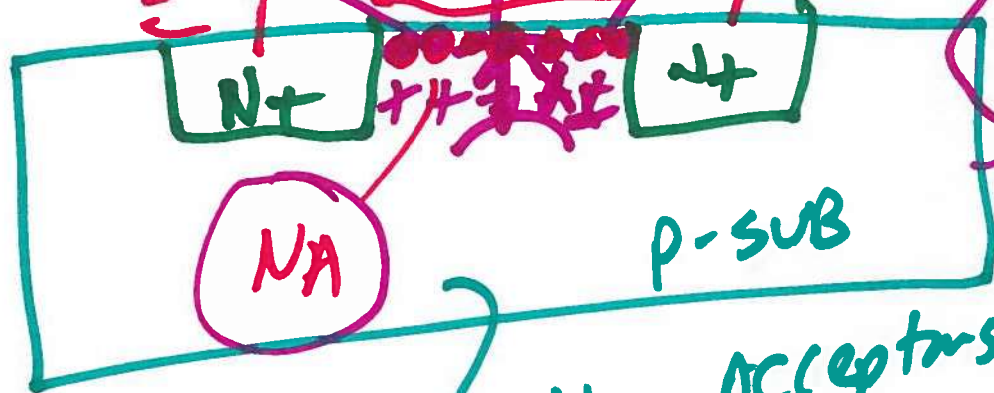
Strong inversion
 $C_{ox} = \frac{C_{ox} \cdot L \cdot W}{A}$
 z_v





$N = N_A$

Enhancement

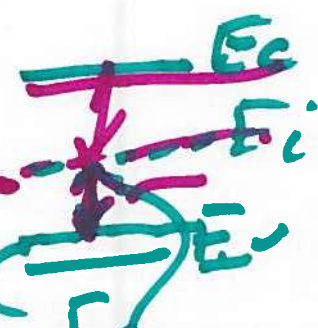


N_A , acceptors
 $= p$

$$- \frac{KT}{q} \ln \frac{N_A}{N_i} \rightarrow p$$

$$+ \frac{KT}{q} \ln \frac{N_i}{N_A} \rightarrow 0$$

$$+ \frac{KT}{q} \ln \frac{N_A}{N_i}$$



$$\frac{KT}{q} \ln \frac{N_A}{N_i}$$

6)

$$X_d = \sqrt{\frac{2\epsilon_{si} |V_s - V_{fp}|}{qNA}}$$

