

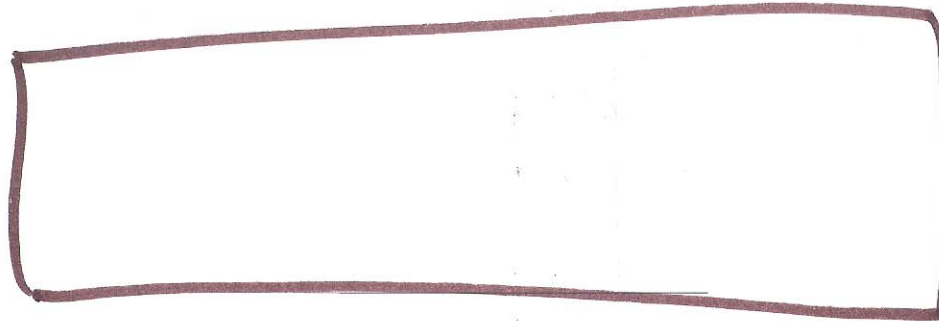
EE 421 / ECG 621

Digital IC Design

Sept. 4, 2013

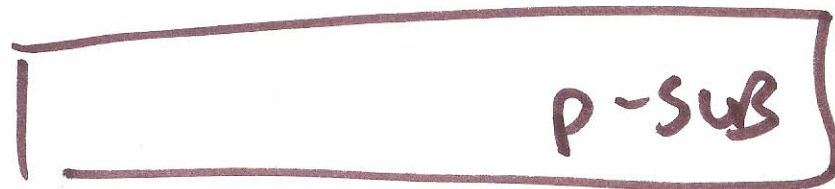
Lecture 3

Layout

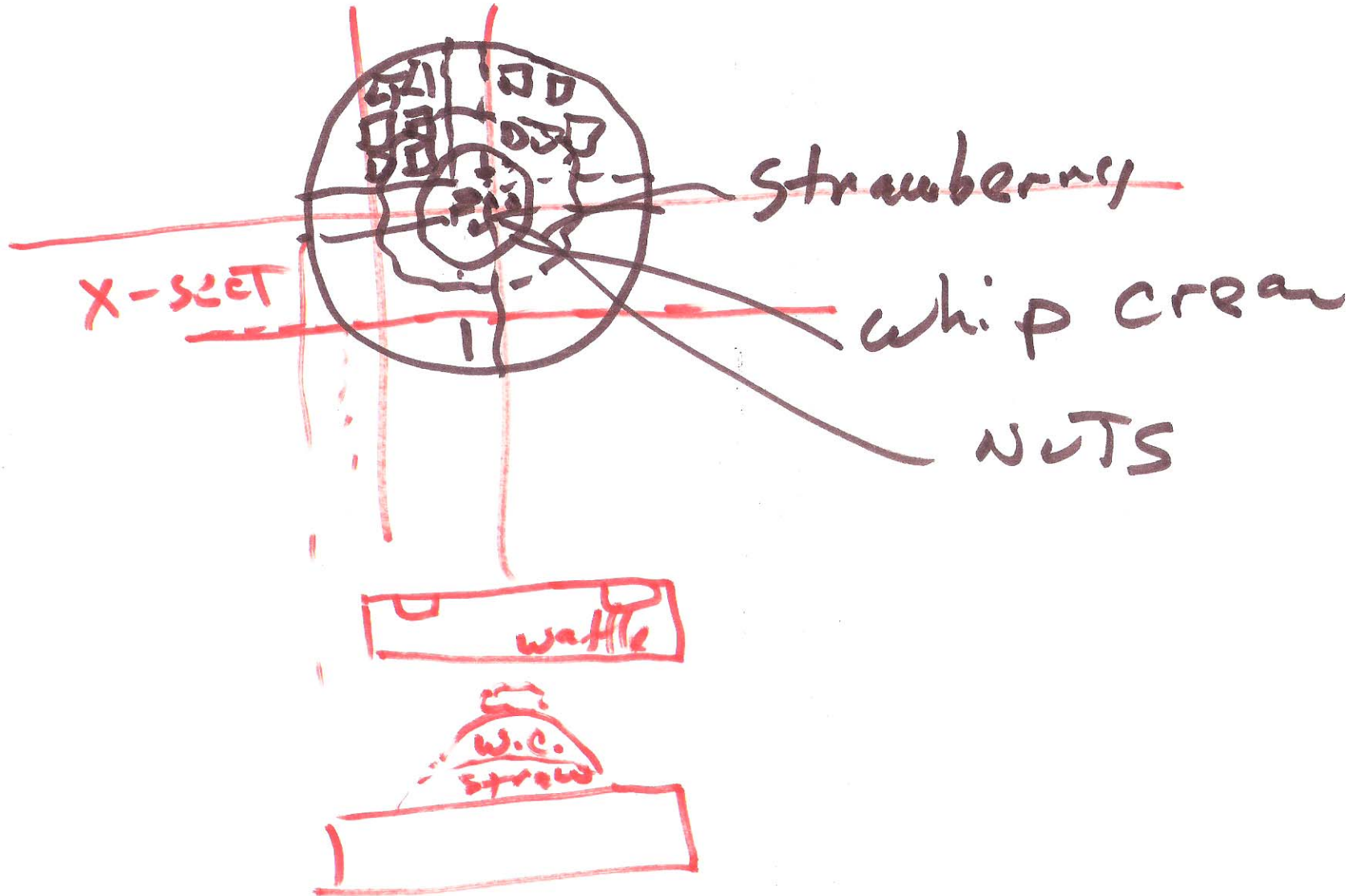


N-well

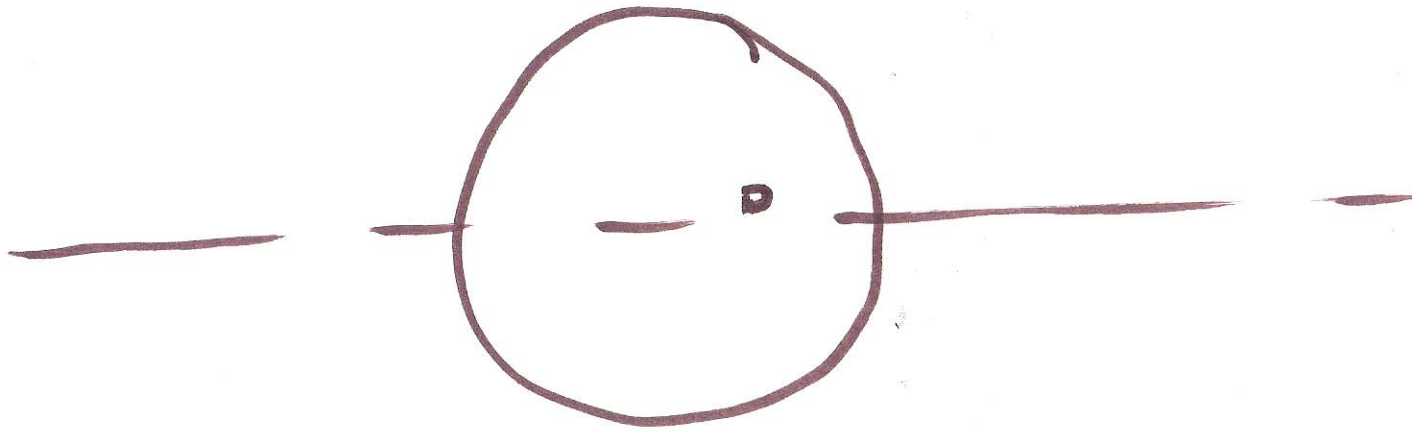
Si added
atom Boron 3 valence
valence e 4



waffle



assumed wafer

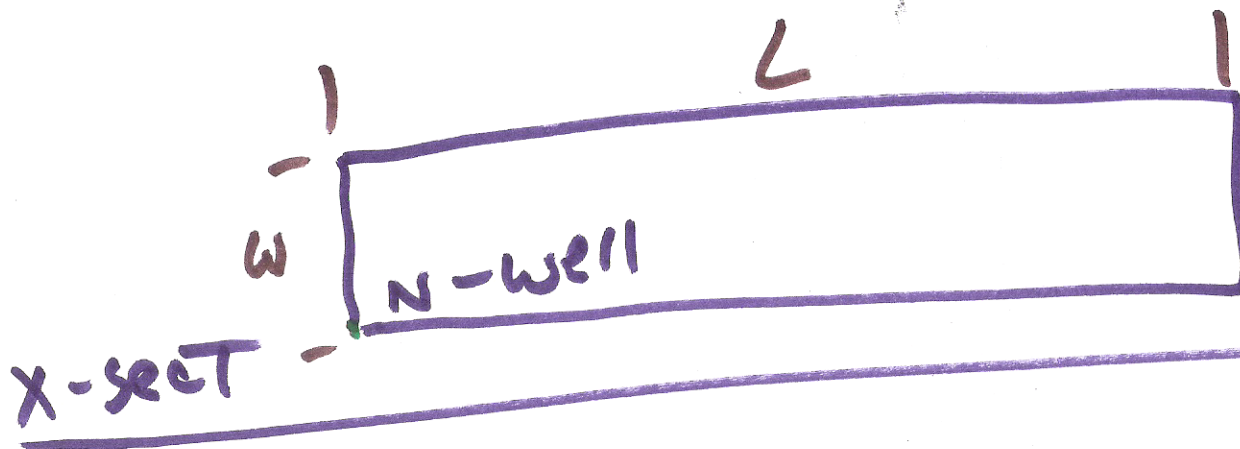


P-SUBSTRATE

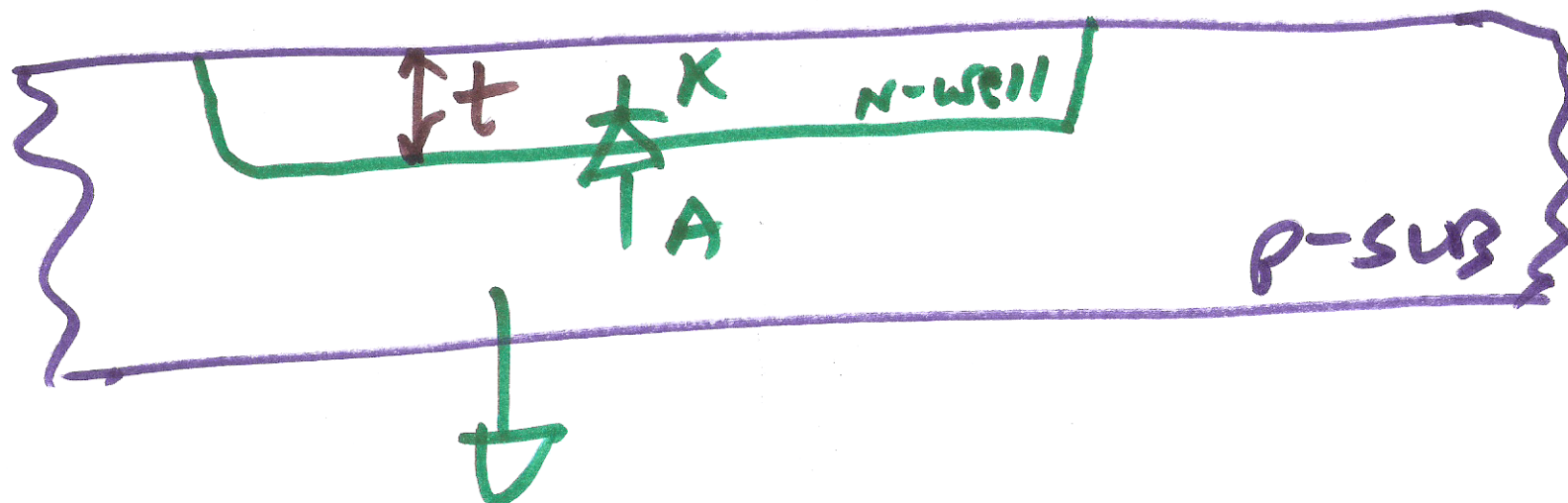
Build things in

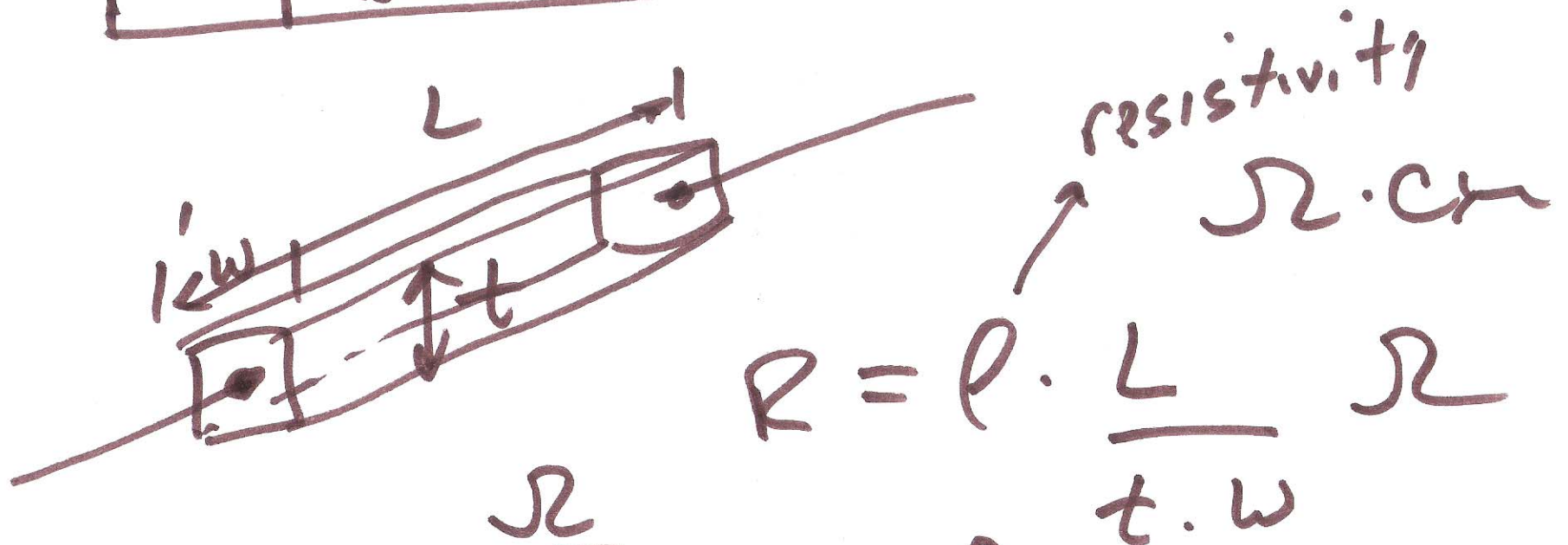
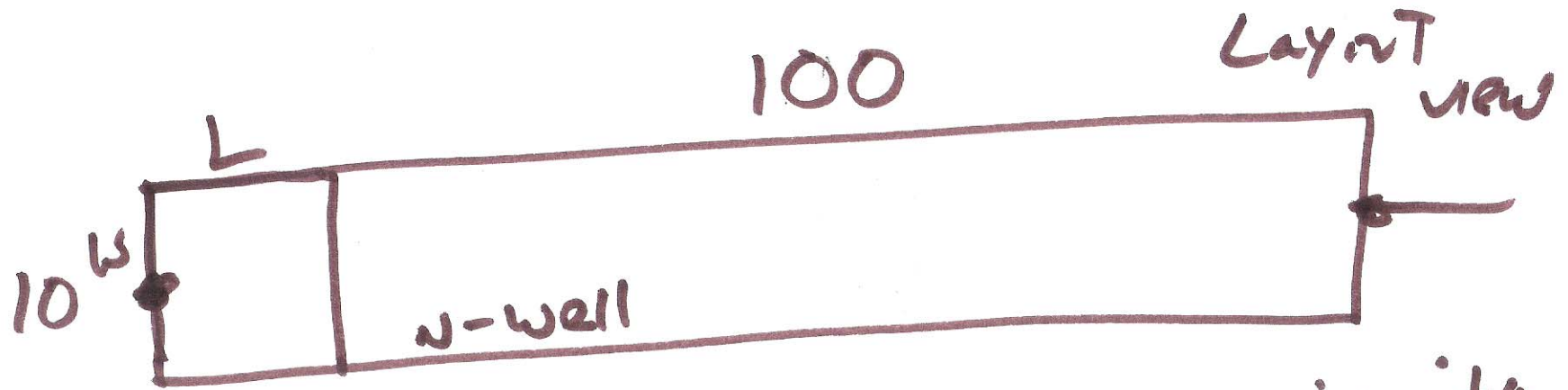
3)

N-well Layer
Layout tube



Body pmos
Resistor
Diode





$$R = \rho \cdot \frac{L}{t \cdot W} \quad \Omega$$

$$= \frac{\rho}{t} \cdot \frac{L}{W}$$

$$\frac{\Omega}{\square}$$

Sheet Resistance

$$R_{D, n\text{-well}} = 800 \Omega/\square$$

$$100 = L = 30\mu$$

$$W = 10$$

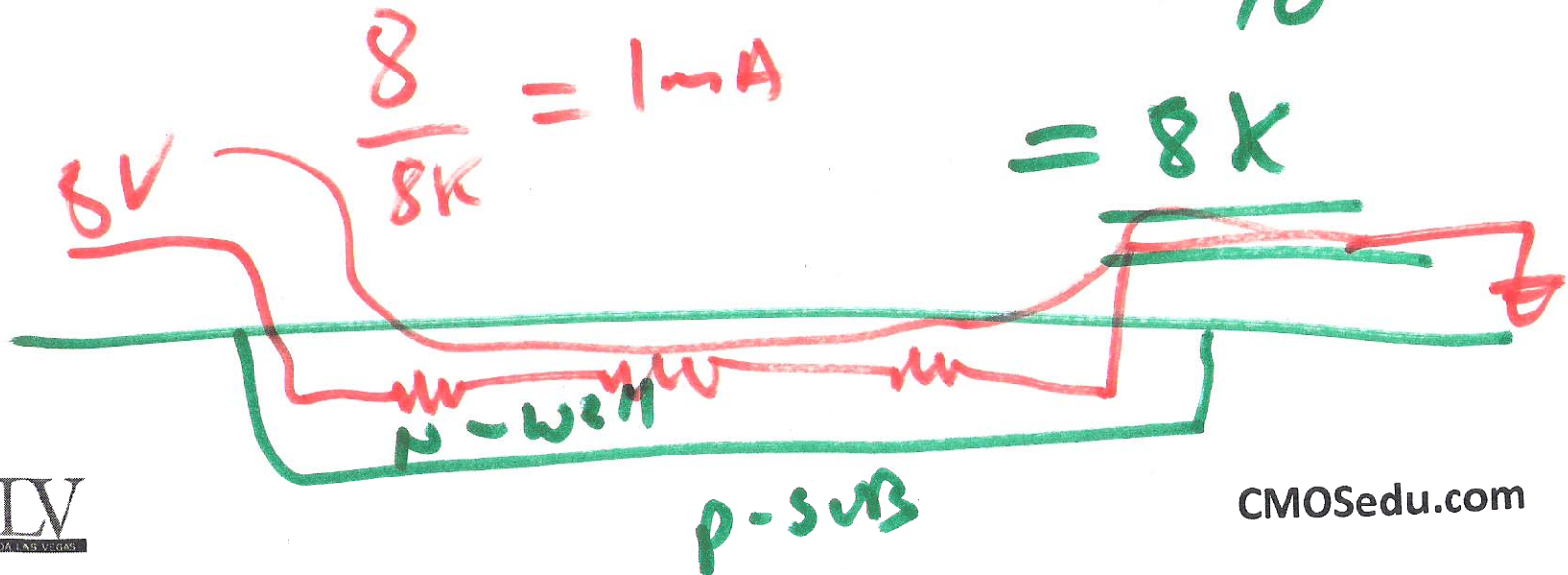
$$= 3\mu$$

$$\lambda = 0.34$$

$$R = R_D \cdot \frac{L}{W}$$

$$= 800 \cdot \frac{100}{10}$$

$$= 8K$$



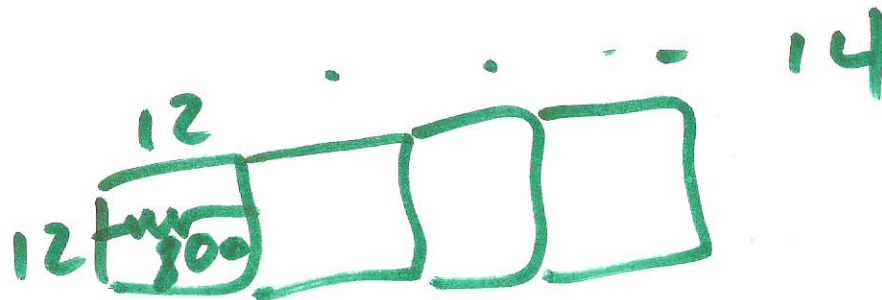
6)

$$R = R_0 \cdot \frac{L}{W}$$

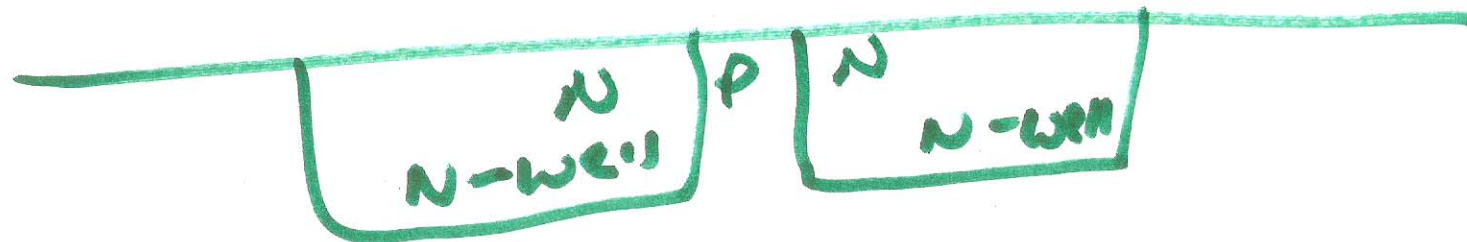
$$10K = 800 \cdot \frac{L}{12}$$

$$L = \frac{120K}{800} = 150$$

$$W = 12$$

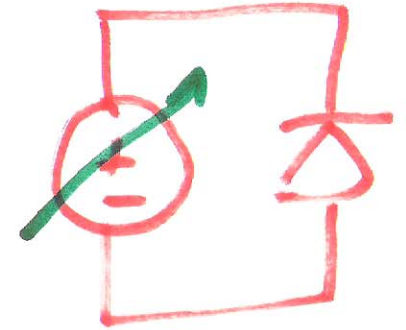


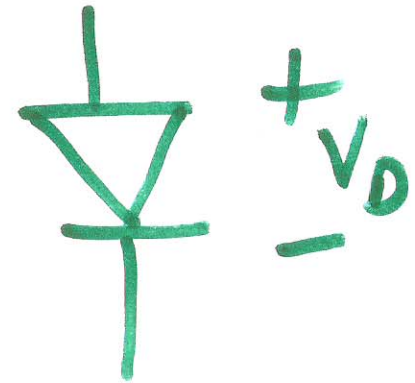
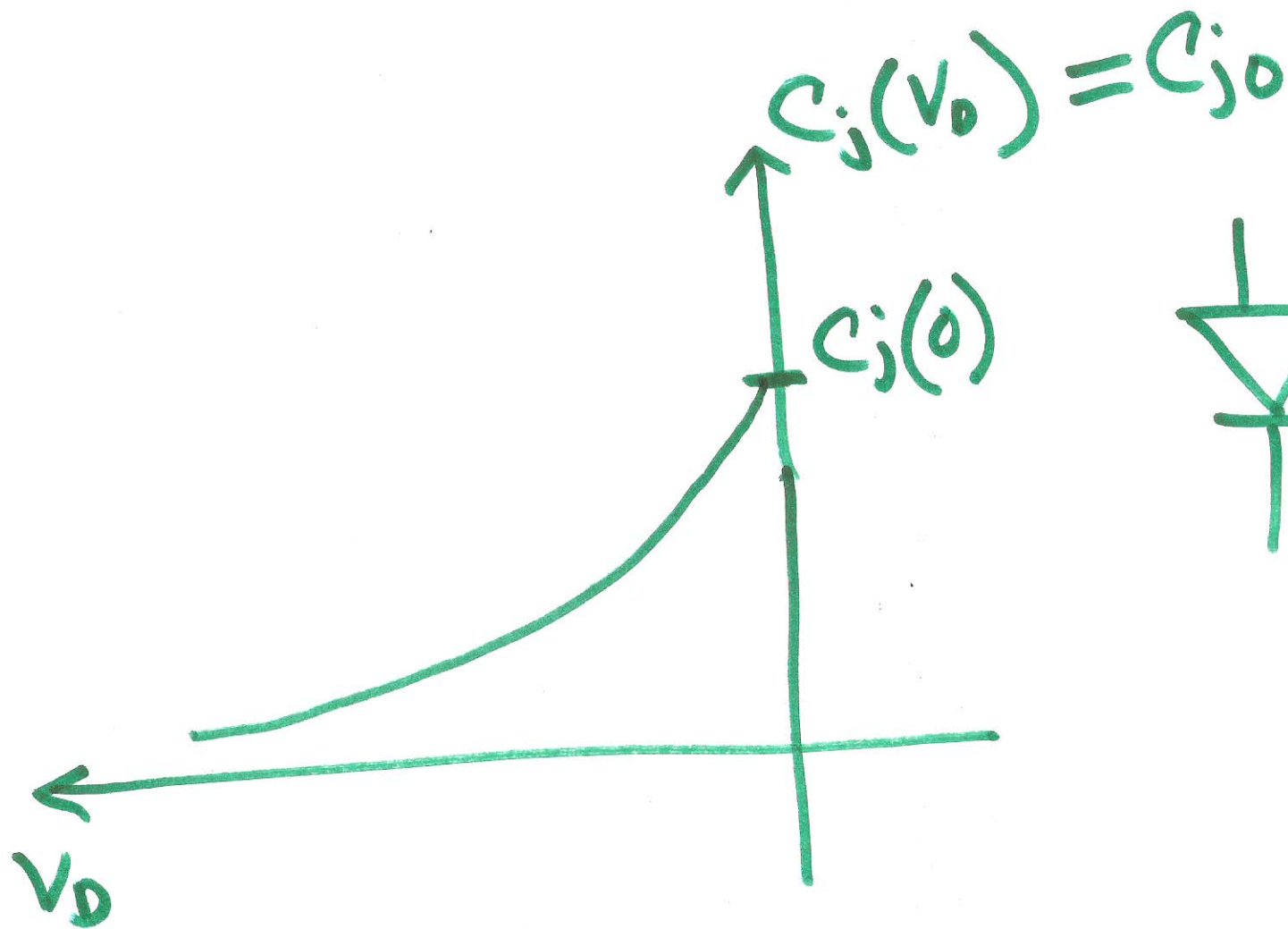
7)



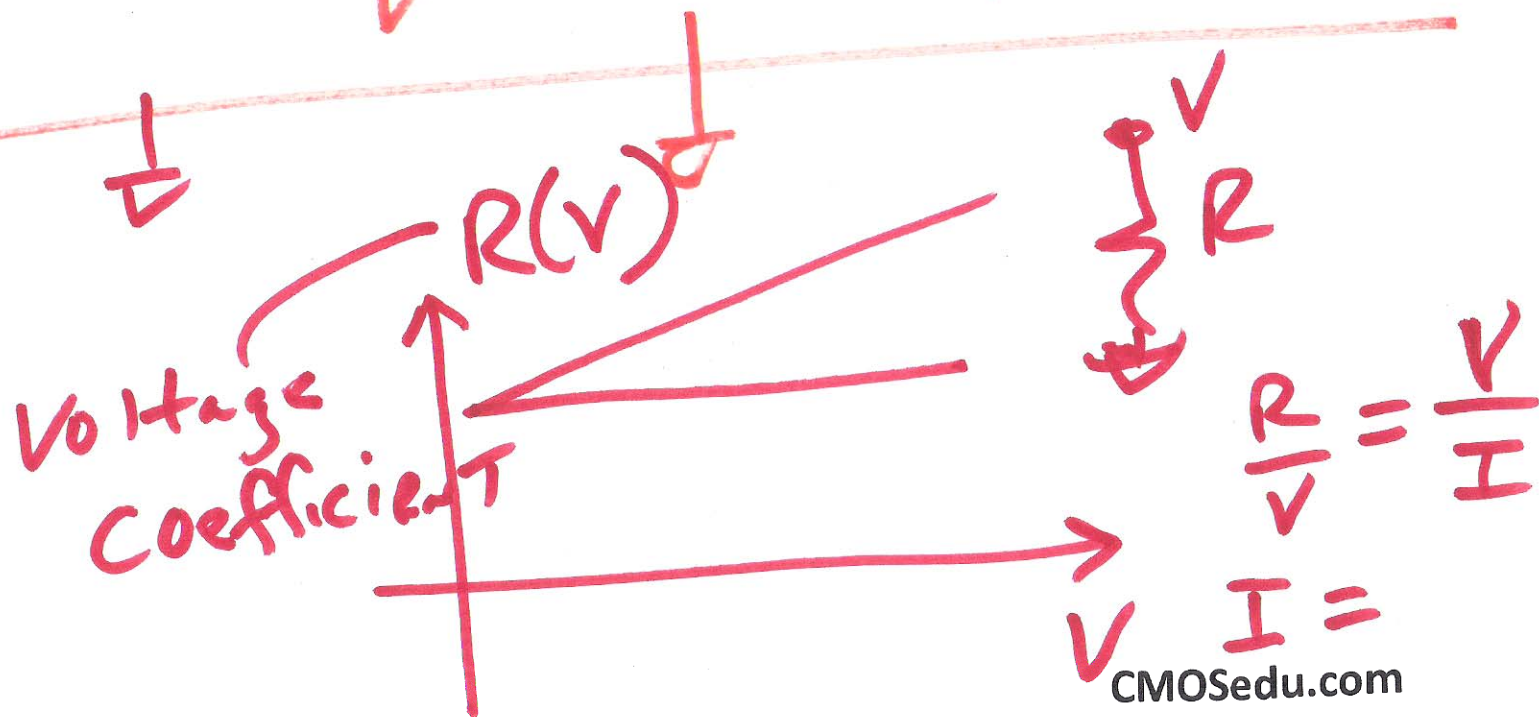
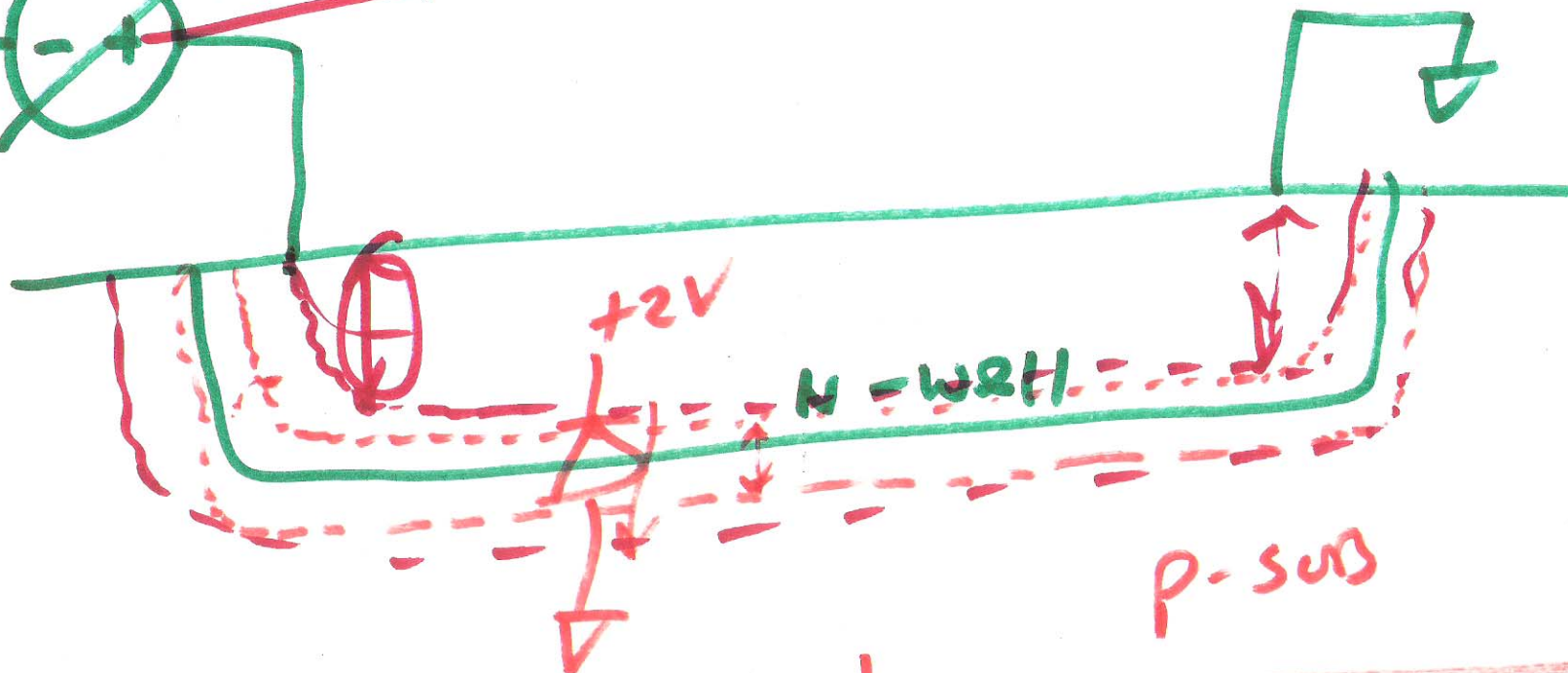
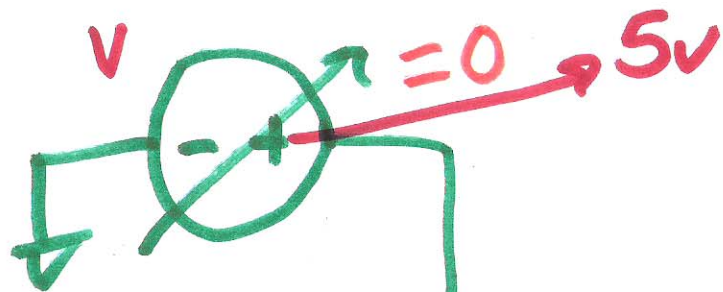
P-SUB

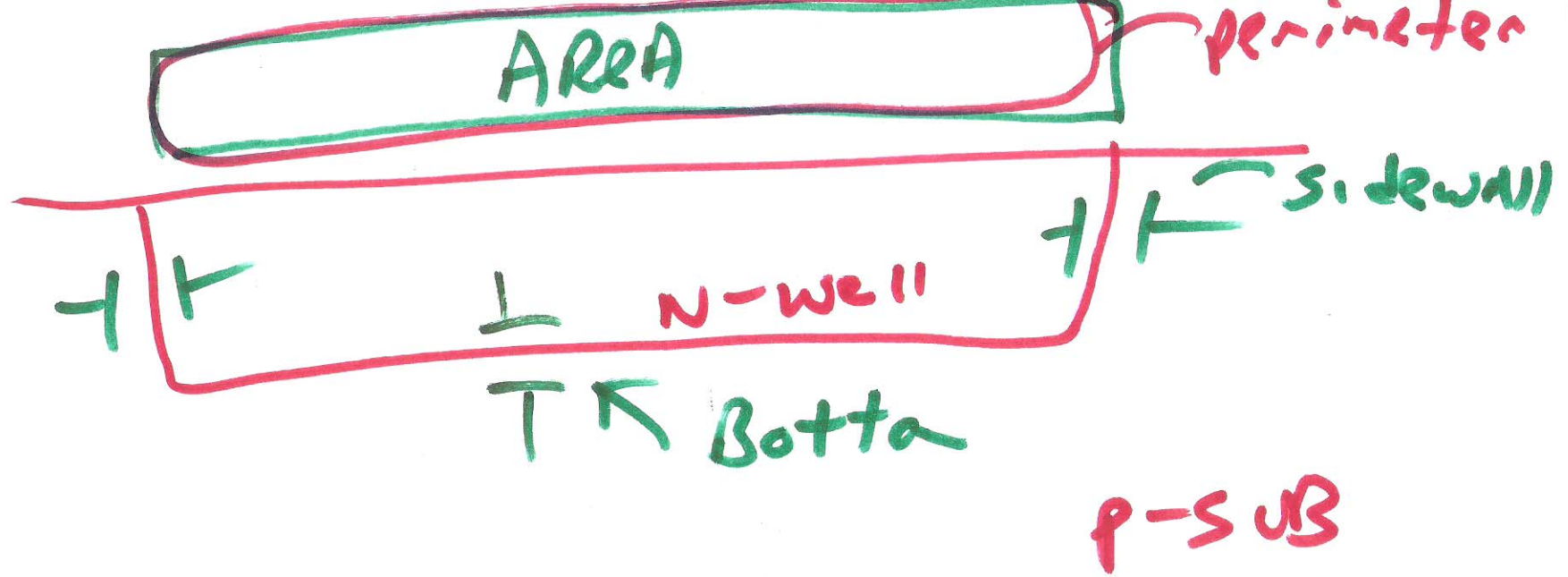
A hand-drawn diagram of a rectangular box divided into two sections. The left section contains 12 circles, and the right section contains 12 dots. A line connects one circle to one dot.





10)





$$C = C_{\text{Bottom}}(\text{AREA}) + C_{\text{sw}}(\text{perimeter})$$

