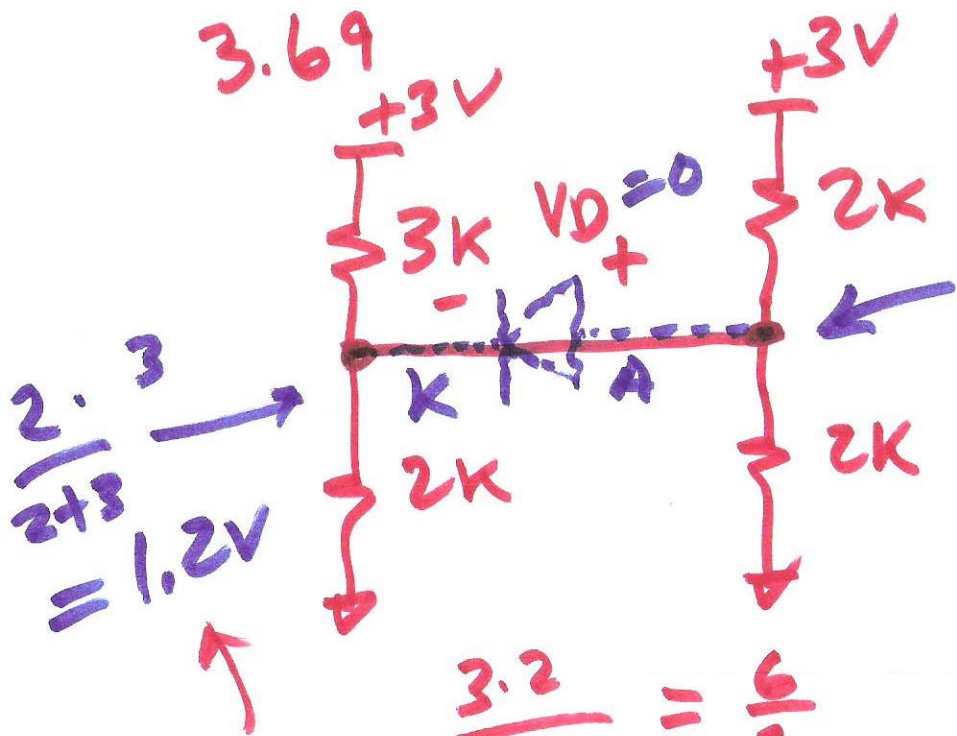


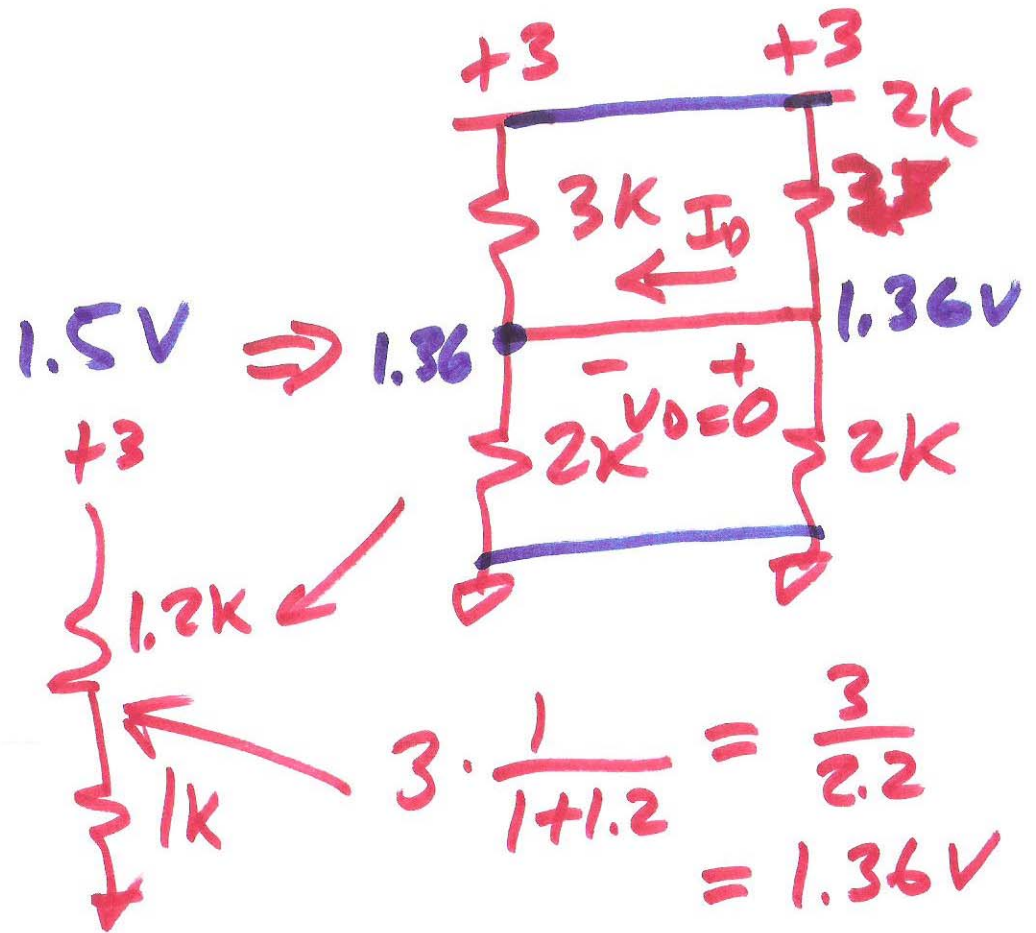
3/13/13

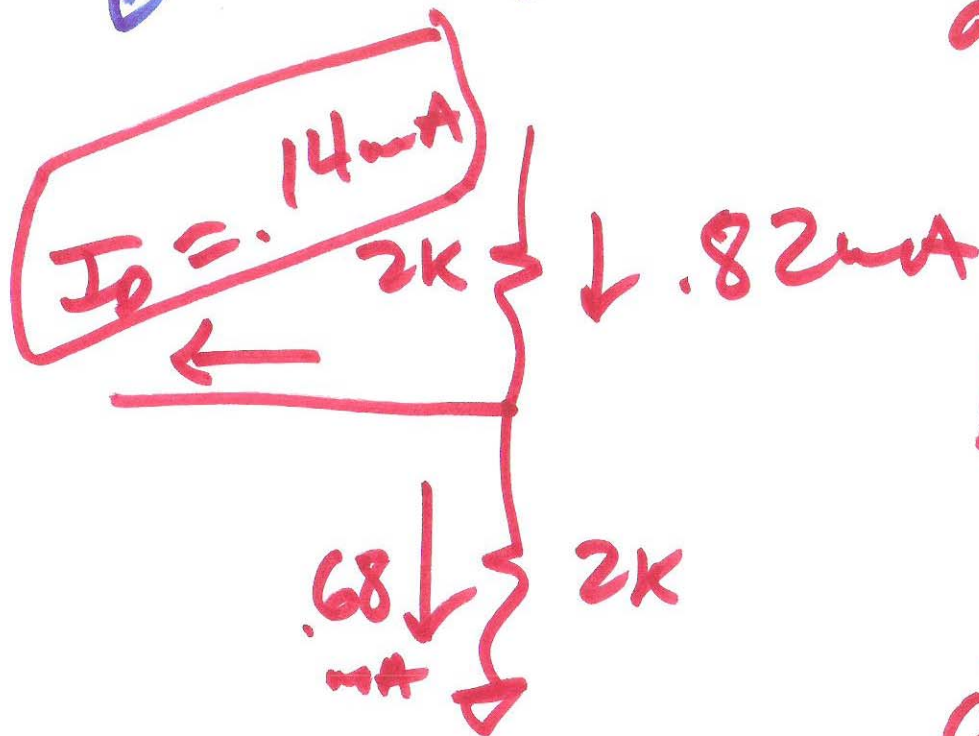
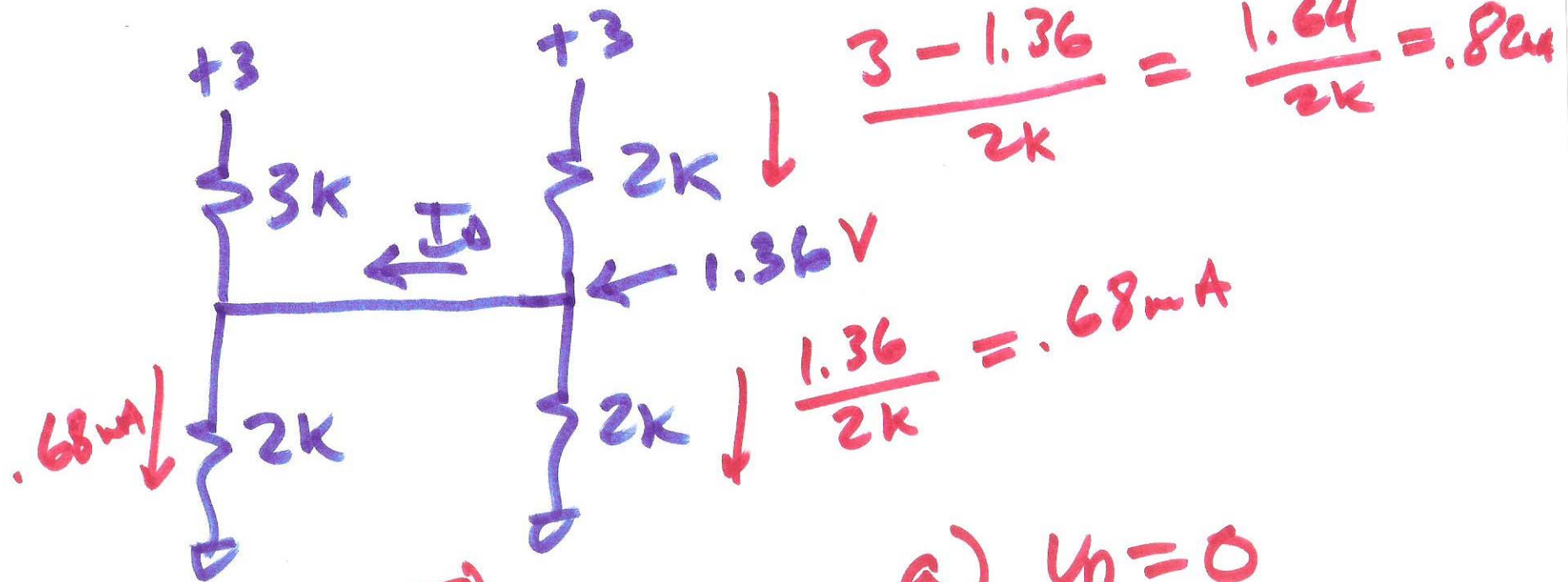
Spring 2013

Questions



$$\frac{3.2}{3+2} = \frac{6}{5} = 1.2 \text{ k}$$

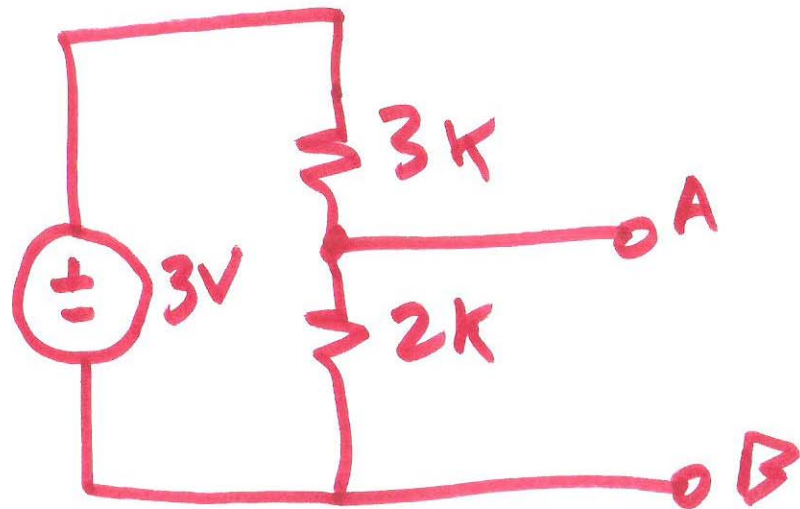




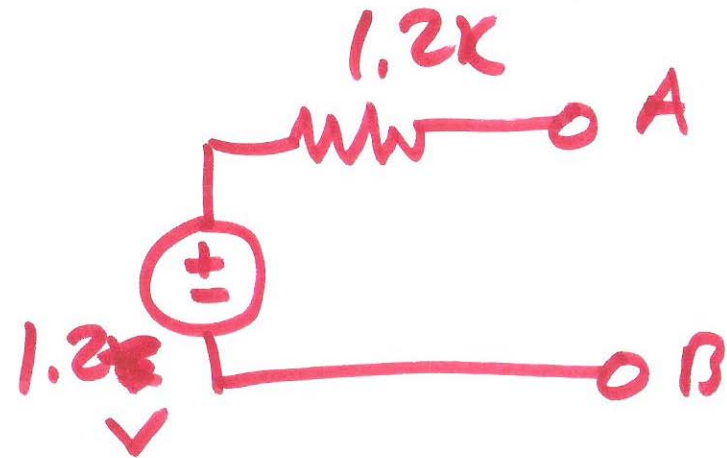
a) $V_D = 0$
 $I_D = 140\mu A$

b) $V_D = .3V$
 $I_D = 0$

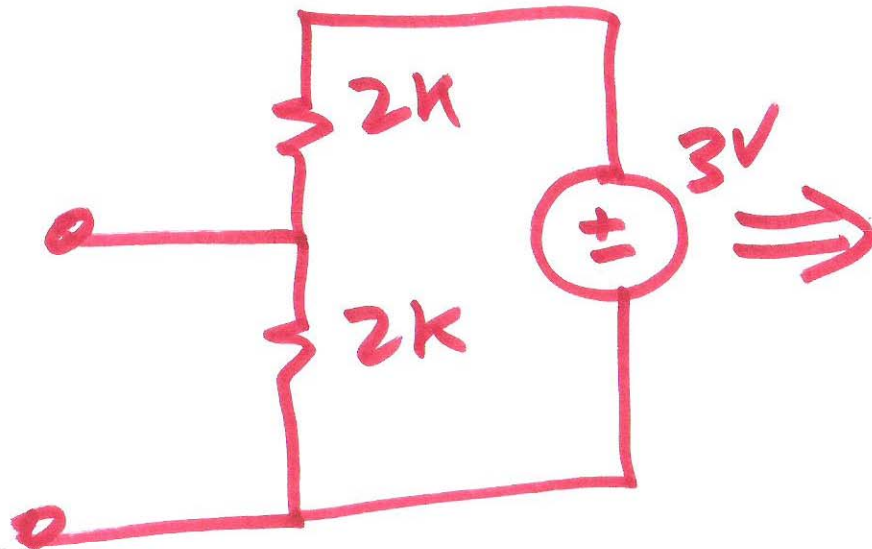
c) b) real diodes
 have a turn-on
 voltage



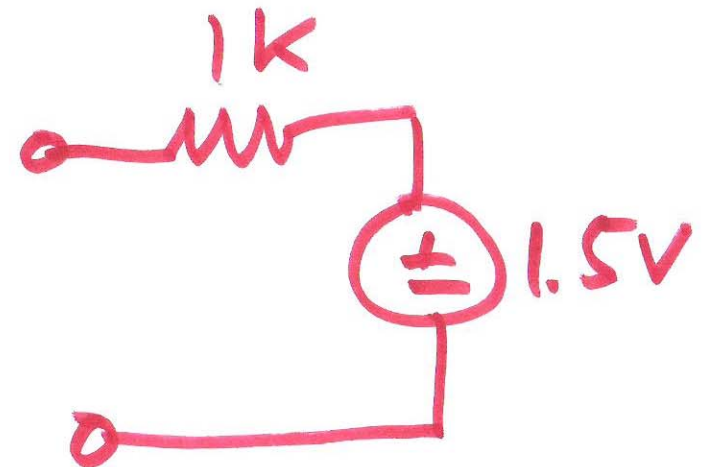
$\Rightarrow$

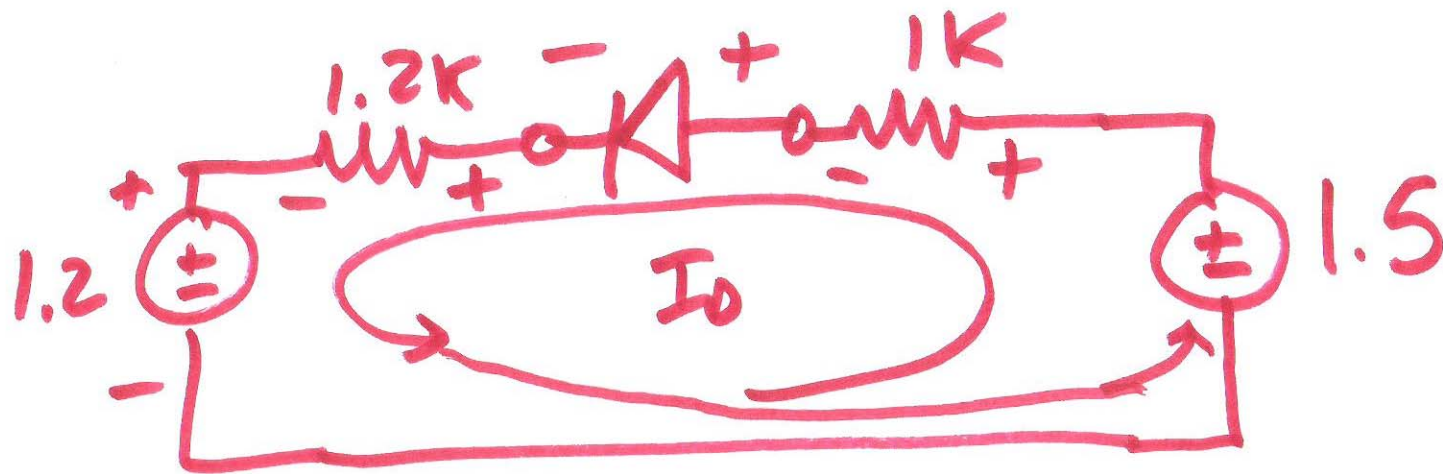


$$\frac{2k}{2k+3k} \cdot 3V$$



$\Rightarrow$





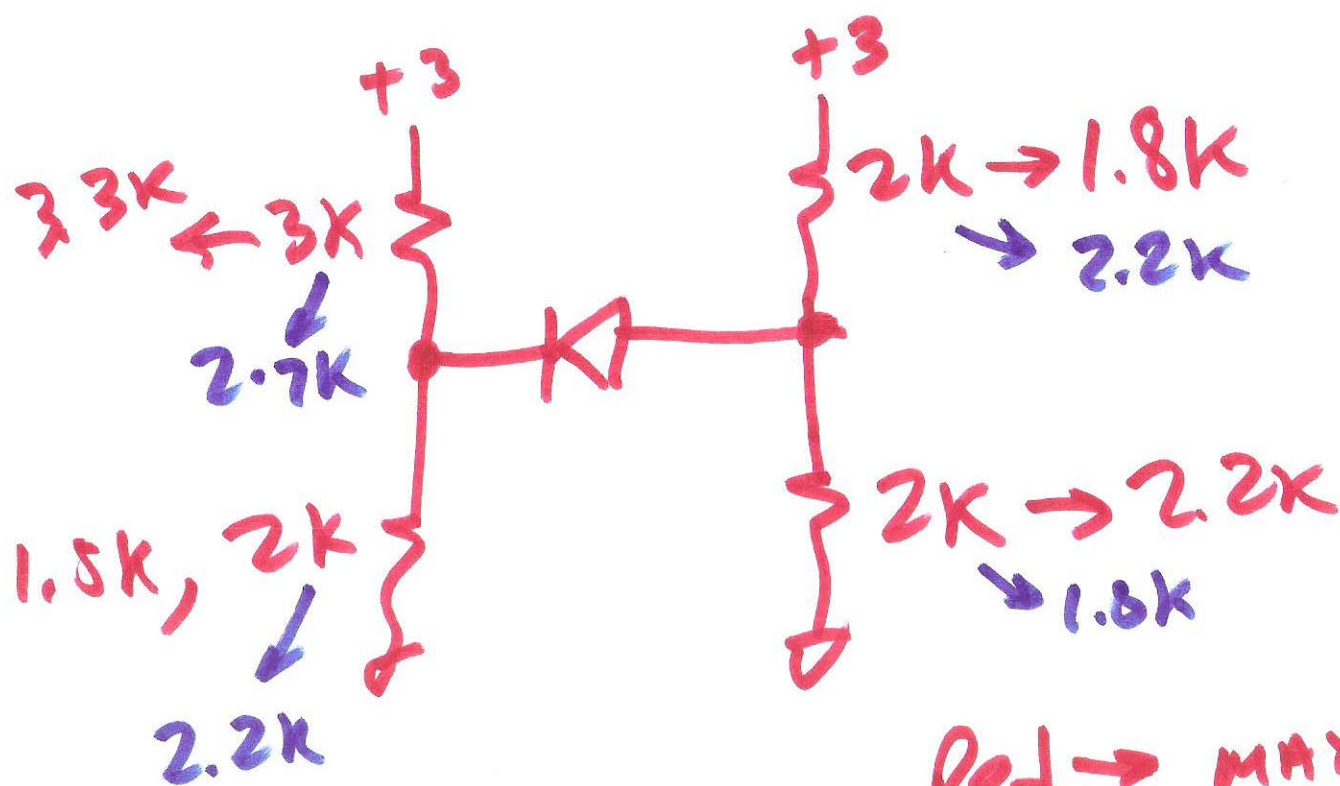
$$1.5 - 1kI_D - V_D - 1.2kI_D - 1.2 = 0$$

$$0.3 - 2.2kI_D - NV_T \ln \frac{I_D}{I_S} = 0$$

$$I_S = 1fA = 10^{-15} A$$

Solve this
for I_D
then

$$V_D = NV_T \ln \frac{I_D}{I_S}$$

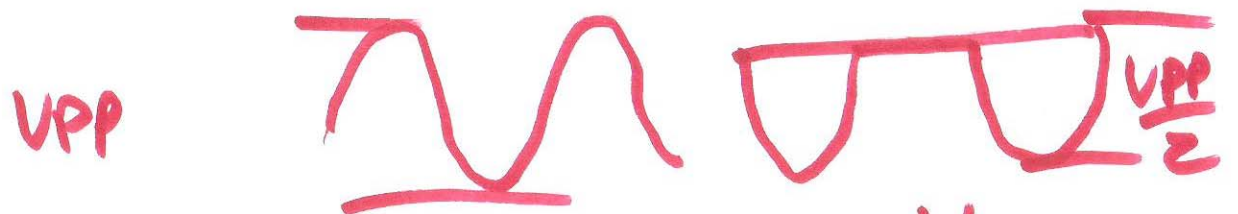
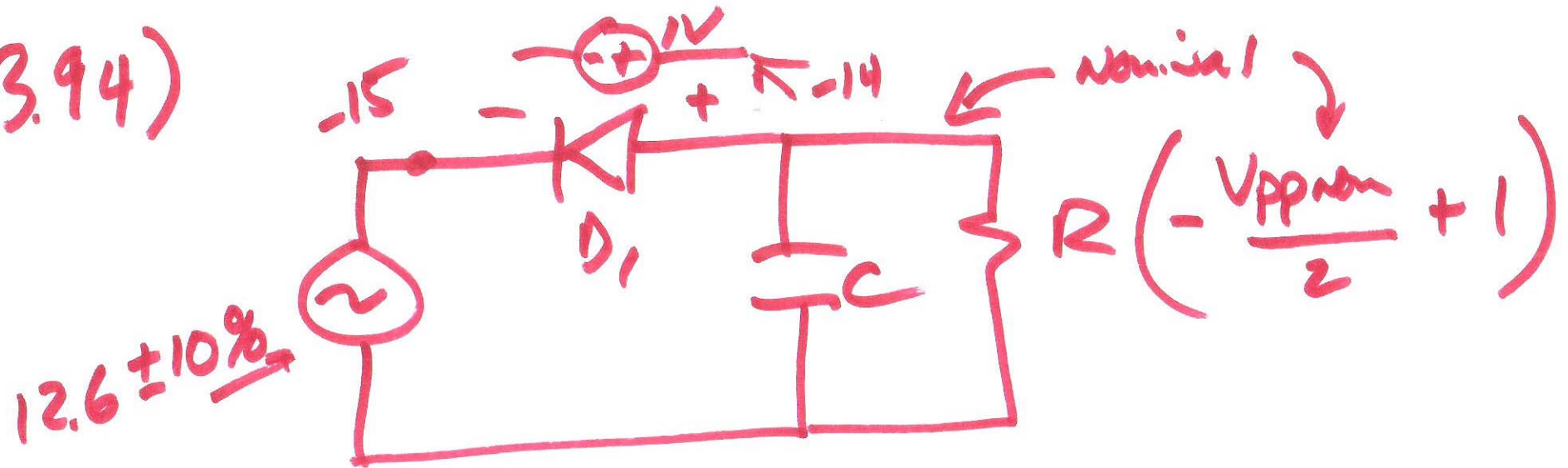


Red $\rightarrow$ MAX V_D, I_D

Blue $\rightarrow$ MIN V_D, I_D

5)

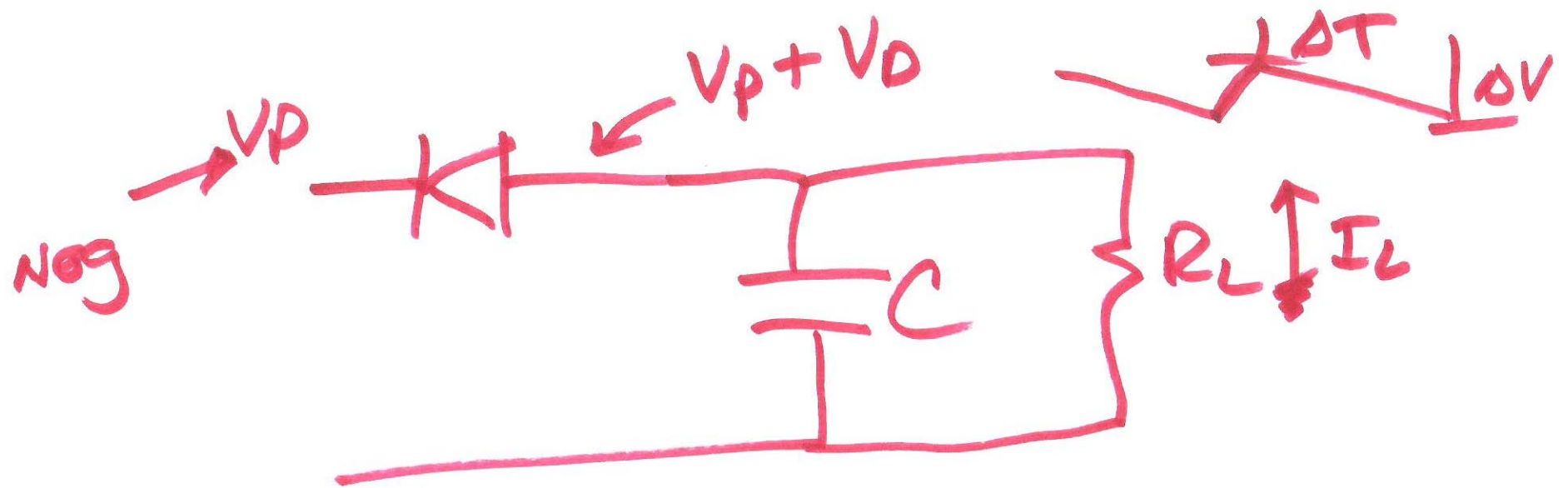
3.94)



Largest V_{pp} $(12.6 + 1.26)\sqrt{2} \cdot 2 = V_{ppmax}$

Smallest V_{pp} $(12.6 - 1.26)\sqrt{2} \cdot 2 = V_{ppmin}$

Nominal V_{pp} $12.6 \cdot \sqrt{2} \cdot 2 = V_{ppnom}$



$$I = C \frac{\Delta V}{\Delta t}$$

$$I_L = C \cdot \text{CONST} = \frac{V_p + V_d}{R_L}$$

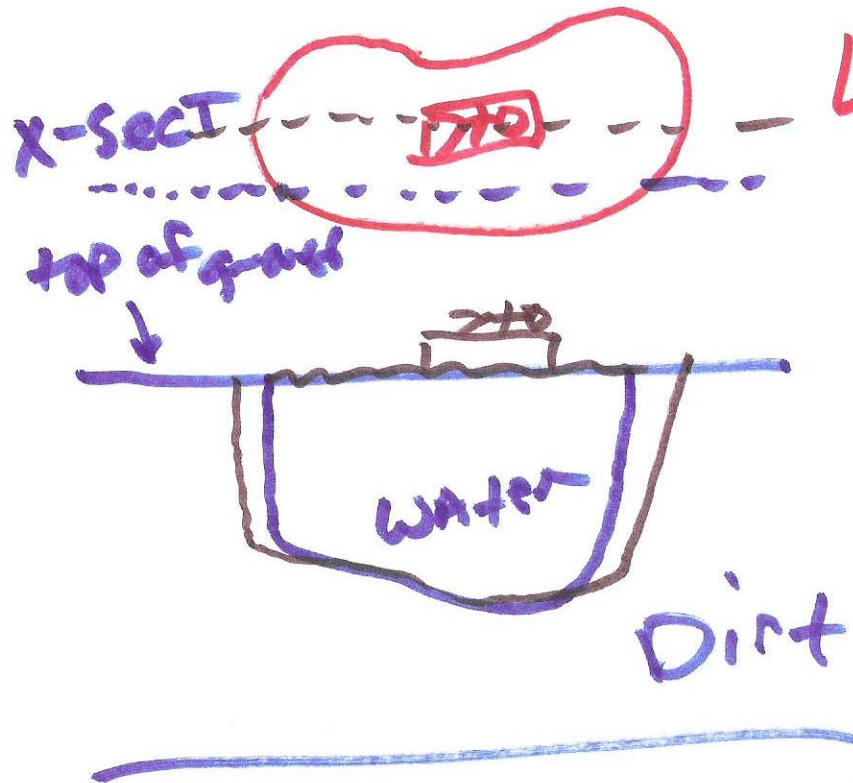
$$\Delta V = \frac{I \cdot \Delta T}{C}$$

$$= \frac{(V_p + V_d) \cdot \Delta T}{R_L \cdot C} \quad \Delta T \approx \frac{1}{f} = \frac{1}{60}$$

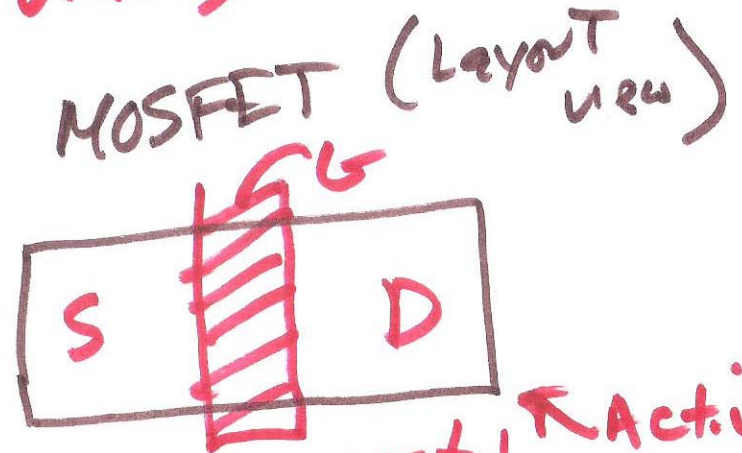
$$\Delta T < T \quad R_L \cdot C$$

$$\Delta T \approx T = \frac{V_p + V_d}{R_L \cdot C \cdot f}$$

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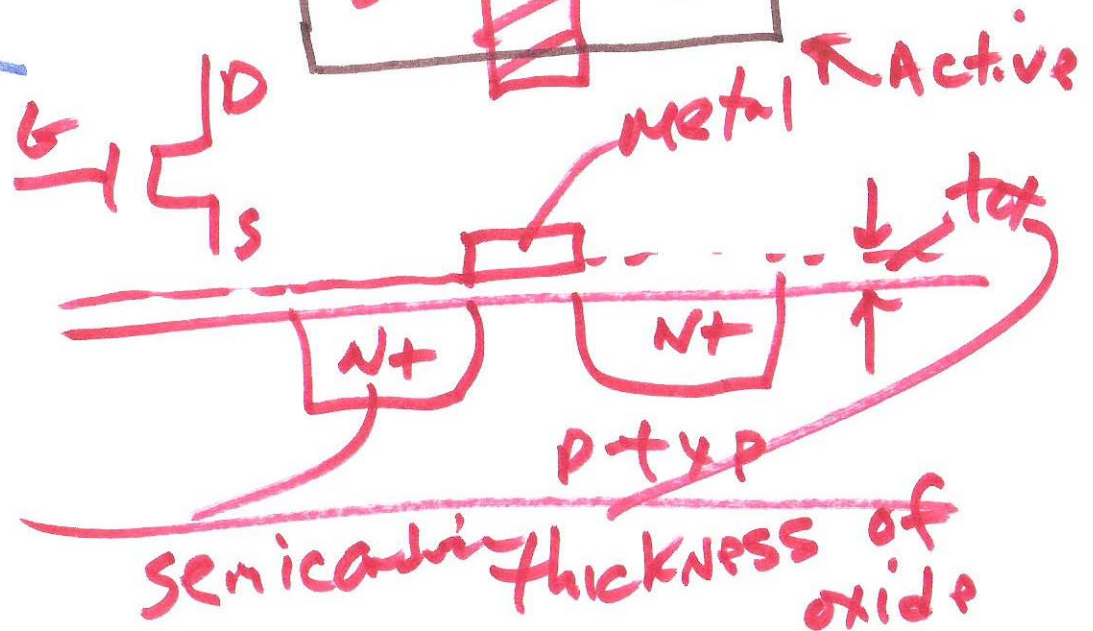


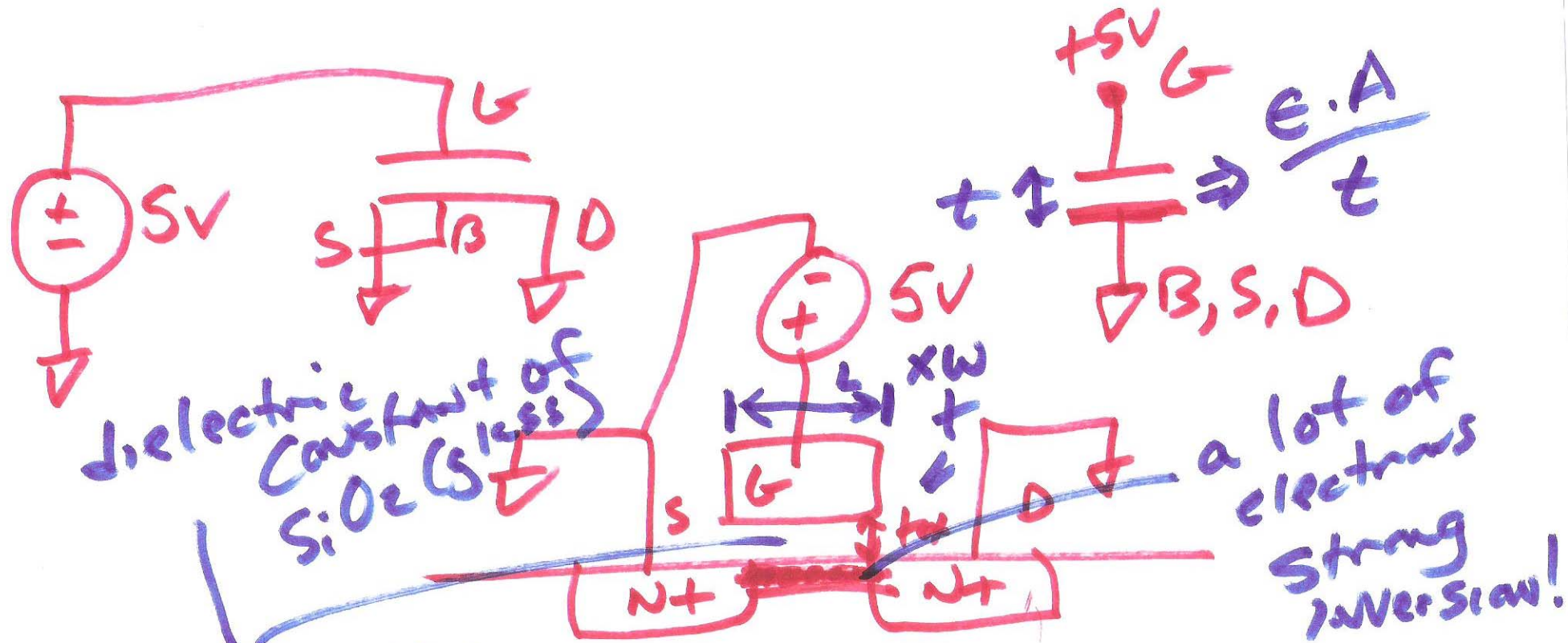
Layout view
(top view)
(plan view)



NOS

SiO_2

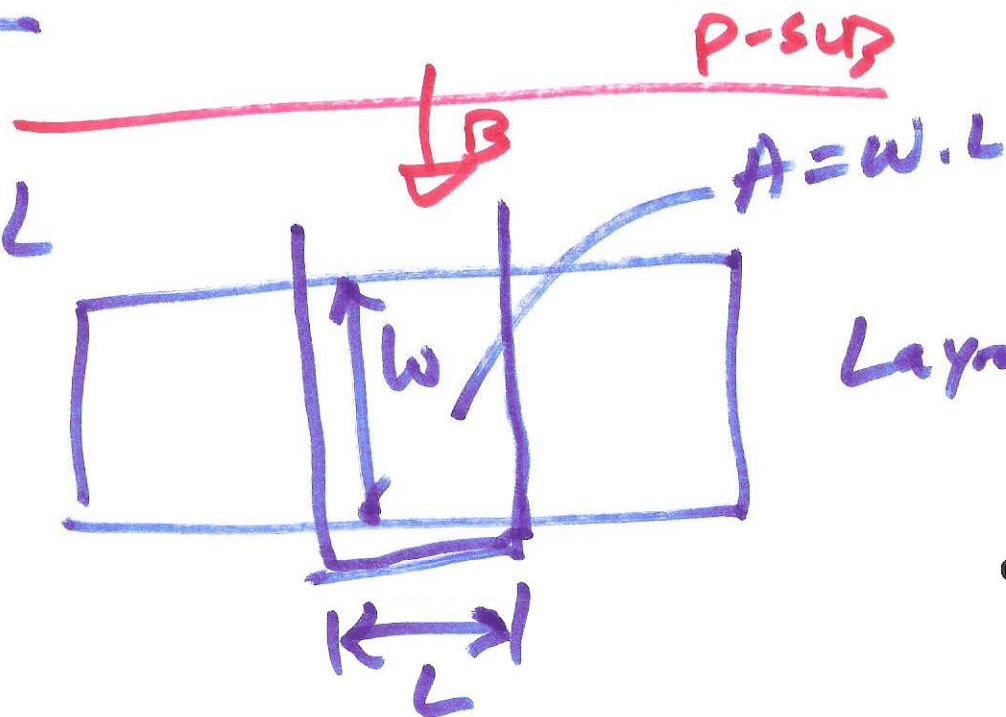


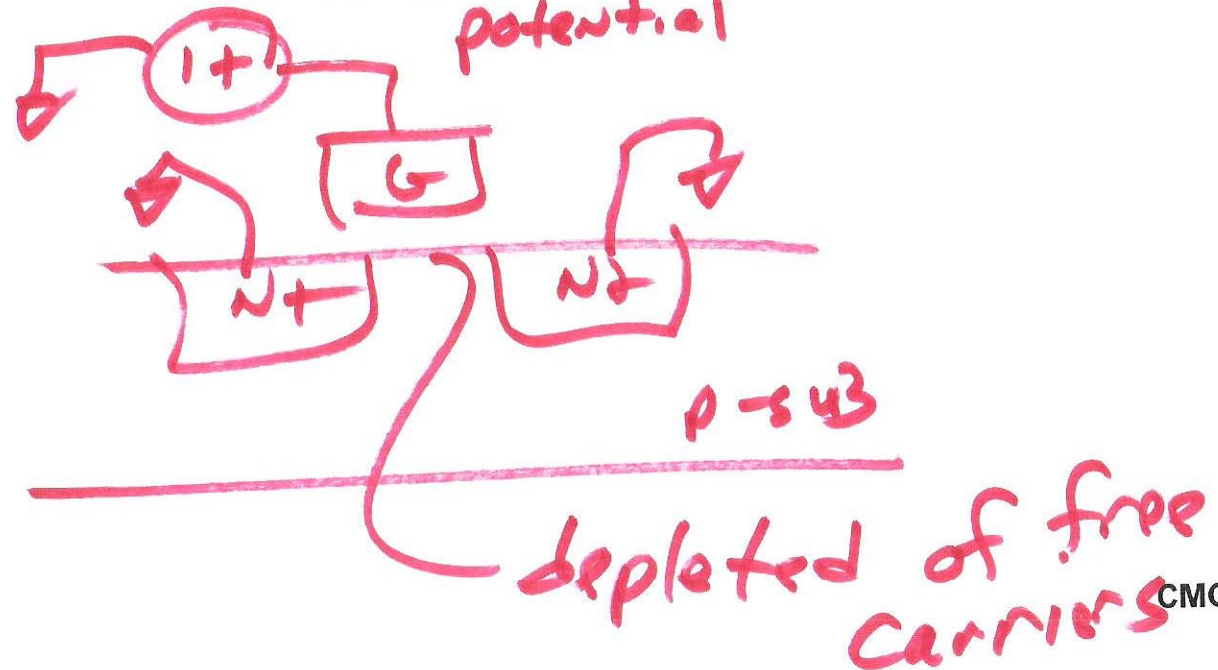
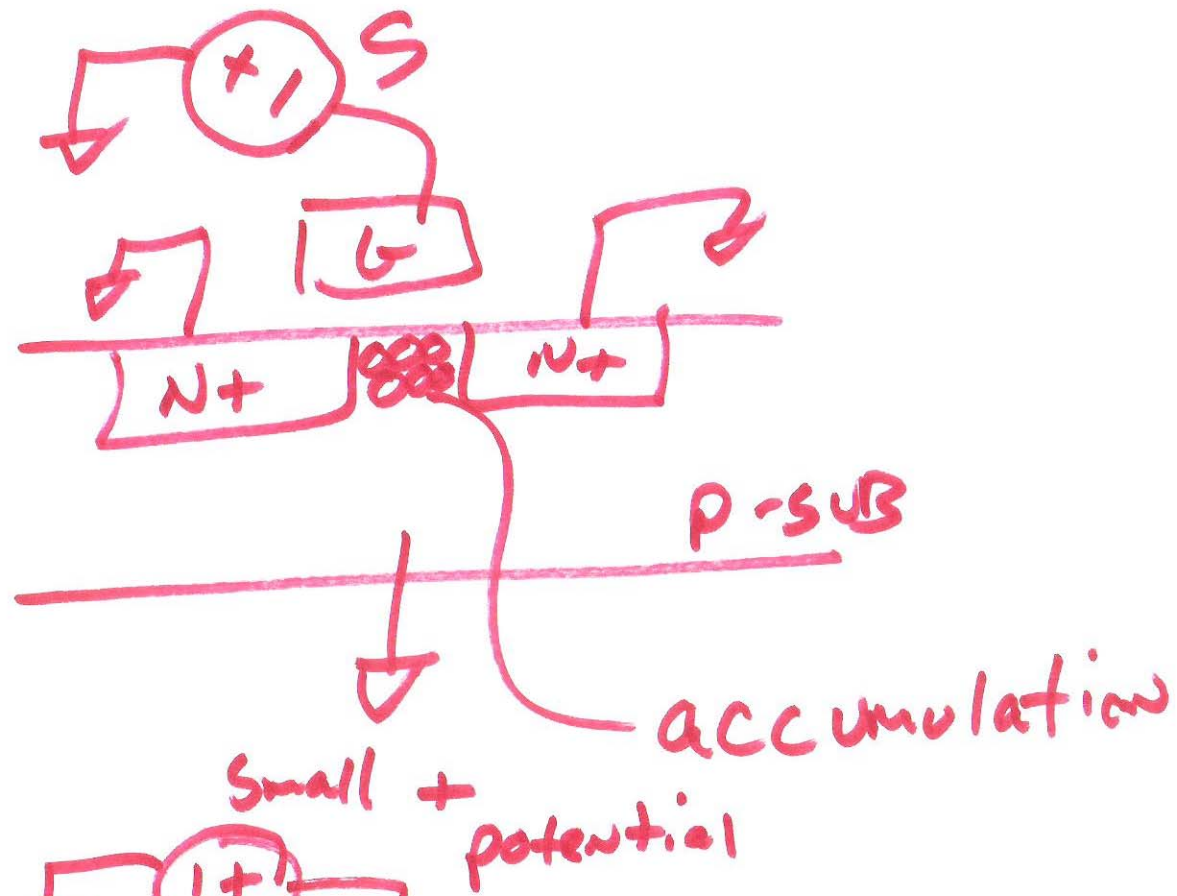


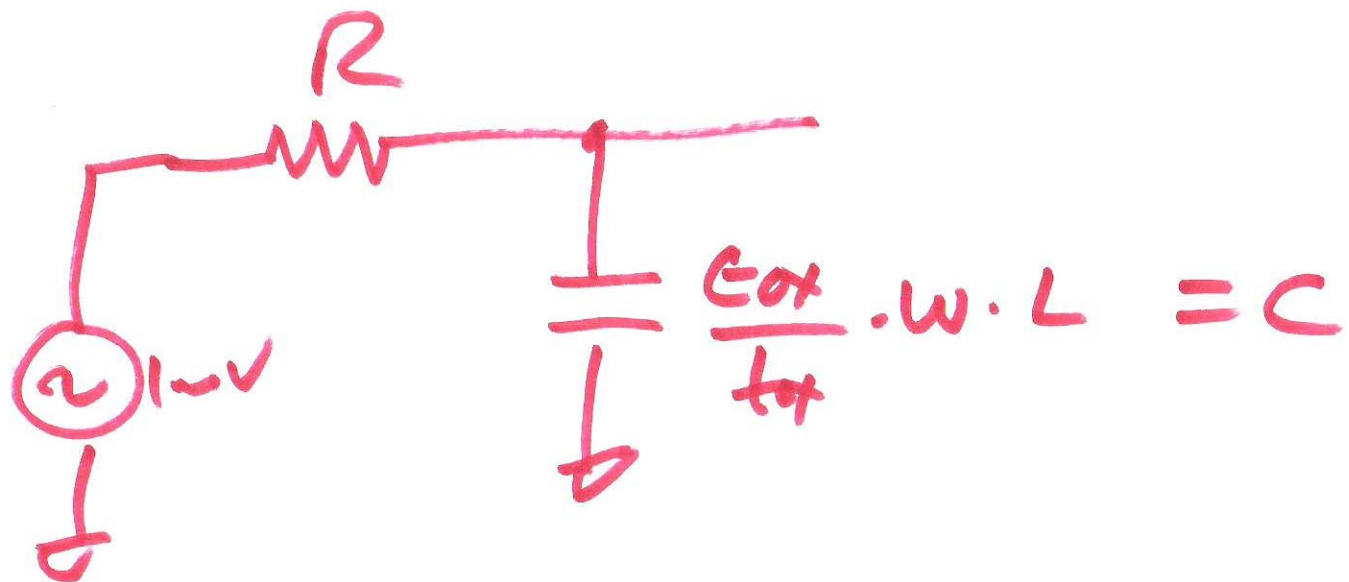
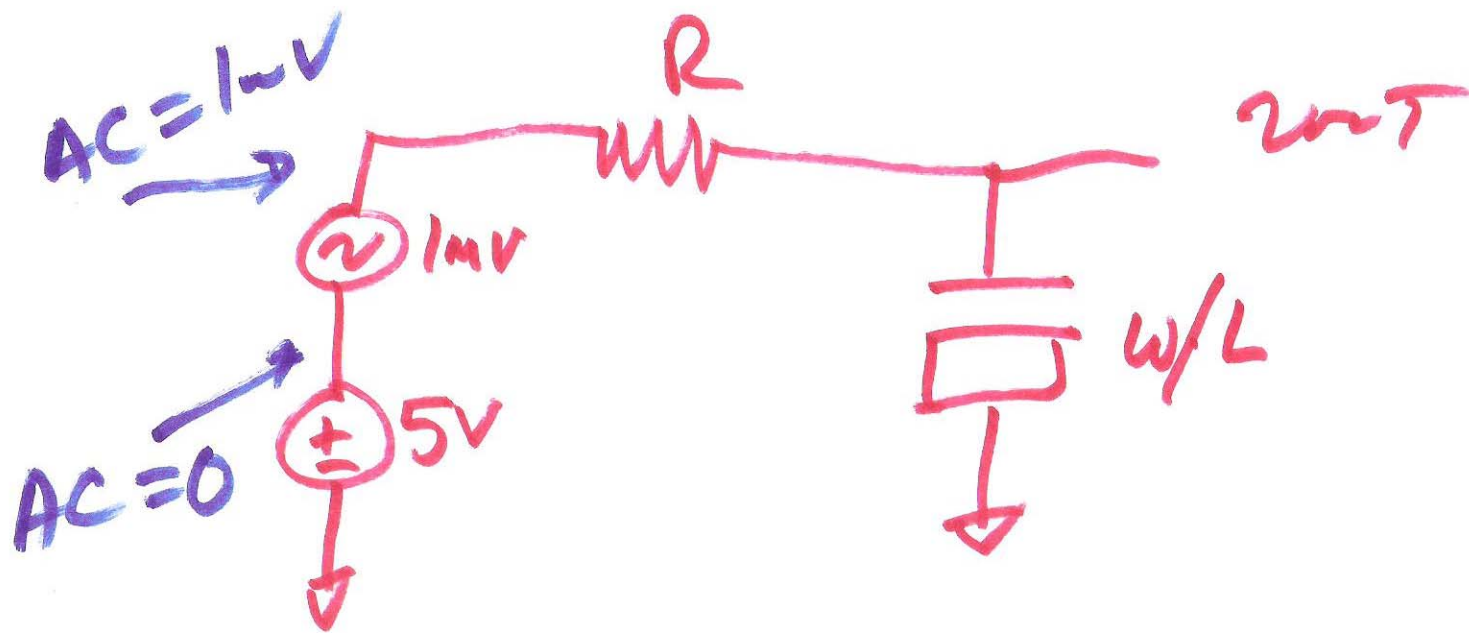
$$C_{ox} = \frac{\epsilon_{ox} \cdot w \cdot L}{t_{ox}}$$

$$= C'_{ox} \cdot w \cdot L$$

$$C'_{ox} = \frac{\epsilon_{ox}}{t_{ox}}$$







11)