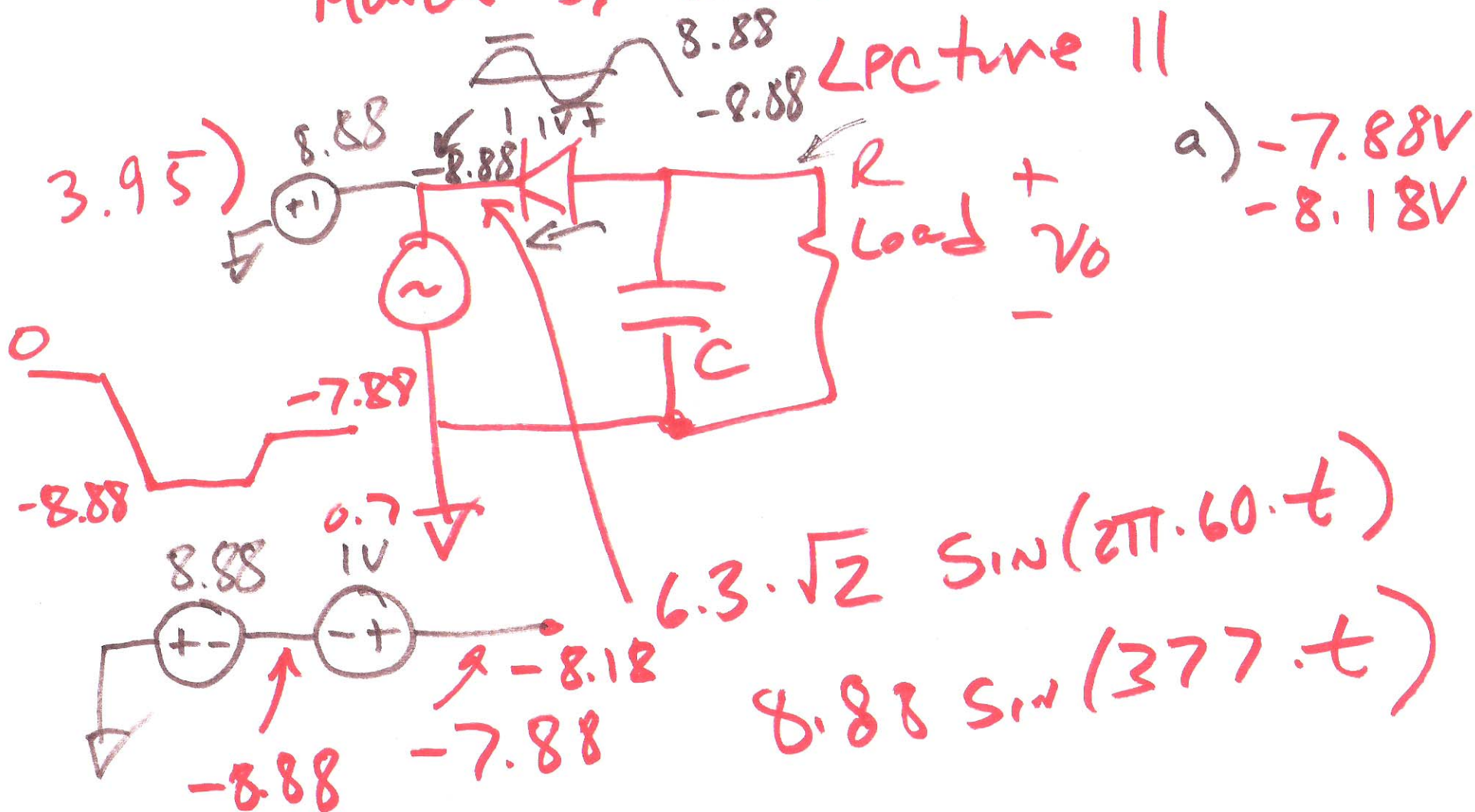


EE 320 Electronics

March 3, 2014

Lecture 11



1)



$$I = C \frac{dV}{dT}$$

$$-\frac{8.18}{0.5} = C \cdot \frac{\Delta V}{\Delta T}$$

$$\frac{0.25}{\frac{1}{60}} = 16.6\mu$$

$$C = \frac{8.18}{0.5} \cdot \frac{16.6\mu s}{0.25}$$

$$C = 1.086 F$$

2)

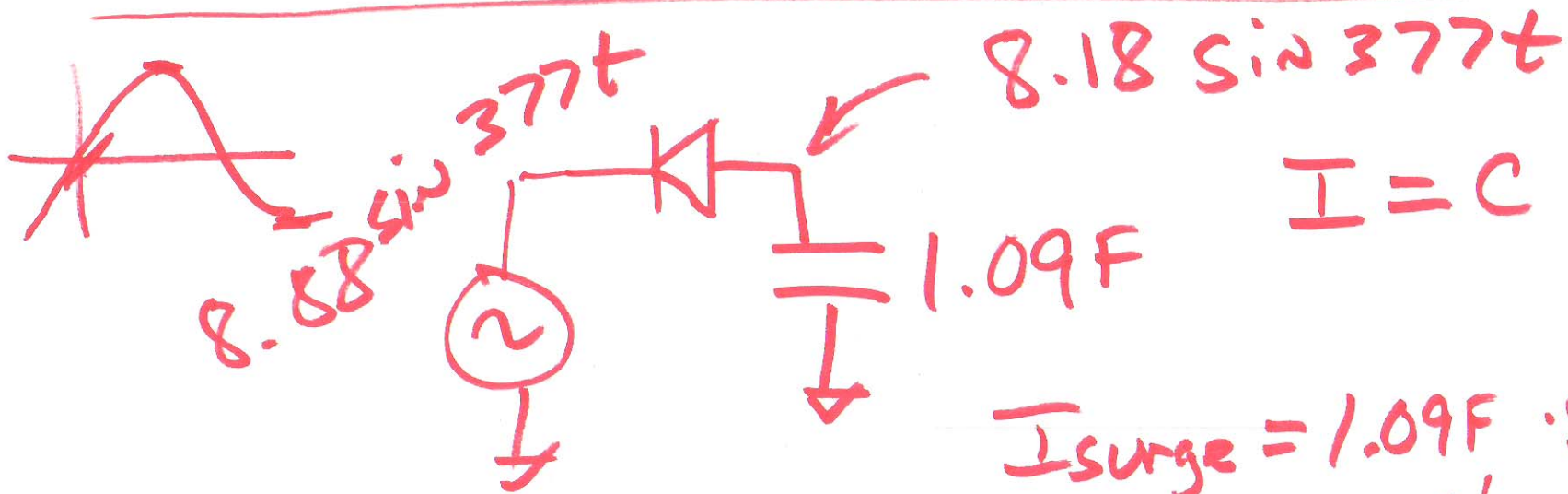


$$\frac{d \sin 377t}{dt}$$

$$377 \cos 377t$$

$$\text{MAX PIV} = 8.88 - (-8.18)$$

$$\approx \underline{\underline{17V}}$$



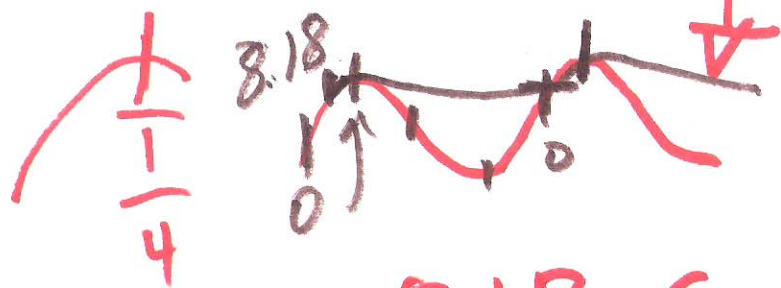
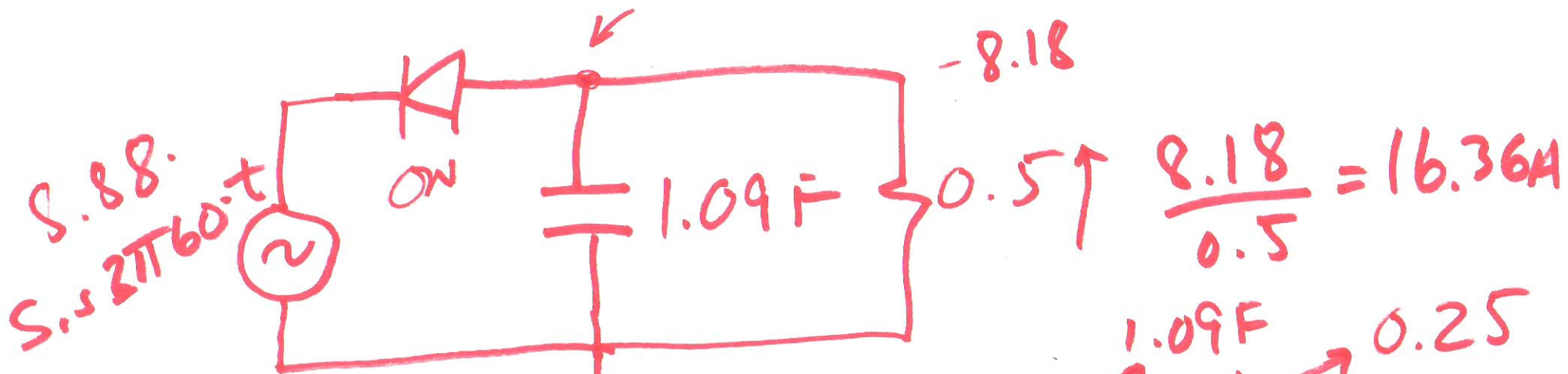
$$I = C \frac{dv}{dt}$$

$$I_{\text{surge}} = 1.09F \cdot \frac{d 8.88 \sin 377t}{dt}$$

$$= 1.09F \cdot 377 \cos 377t \cdot 8.88$$

$$I = 1.09 \cdot 377 \cdot (8.88)$$

3)



$I = C \cdot \frac{dV}{dt}$

1.09 F

0.25

t_{peak}

$-t_{\omega}$

$8.18 \sin 377 t = 8.18$

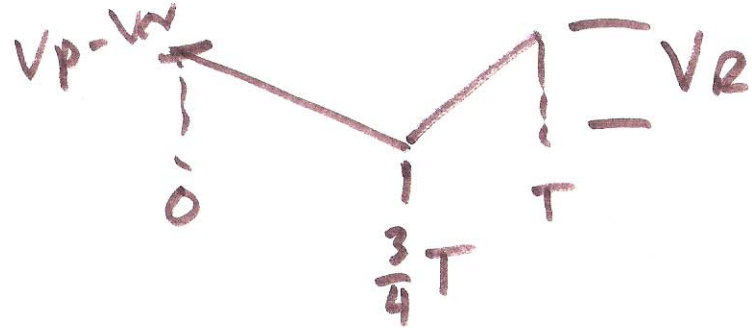
$8.18 \sin 377 t_{\omega} = 7.93$

$t_{peak} = \frac{16.67 \mu s}{4}$

$t_{\omega} = \frac{\sin^{-1} \frac{7.93}{8.18}}{377} = \frac{1}{377} \sin^{-1} \frac{7.93}{8.18}$

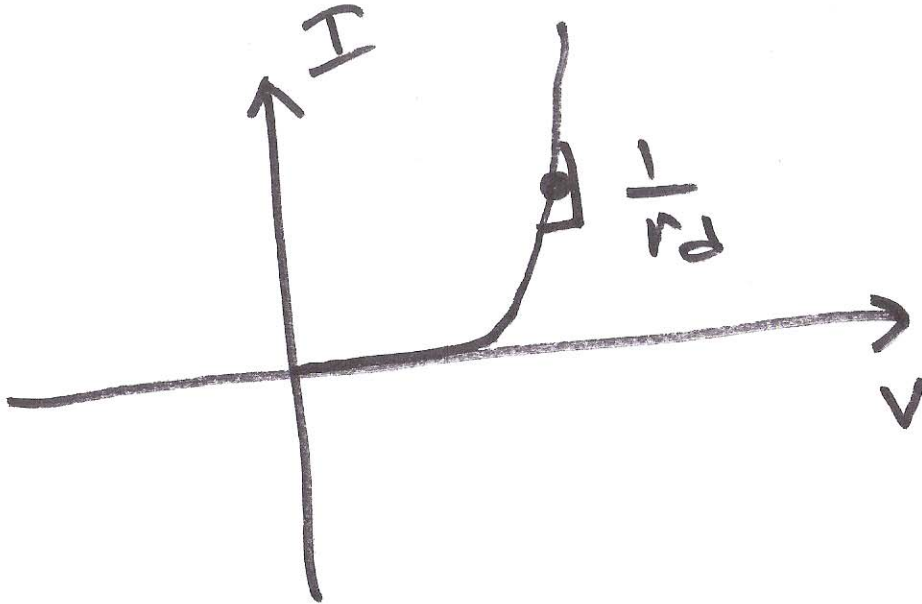
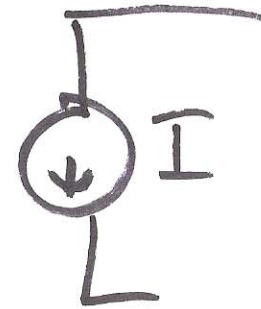
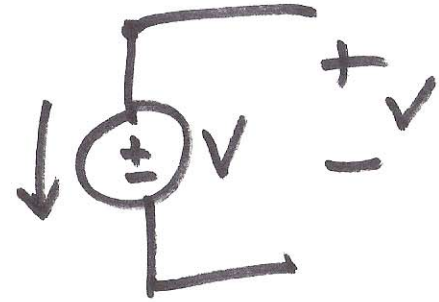
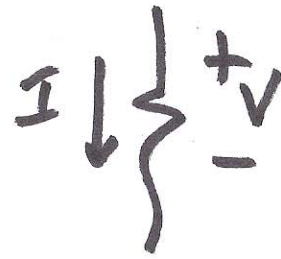
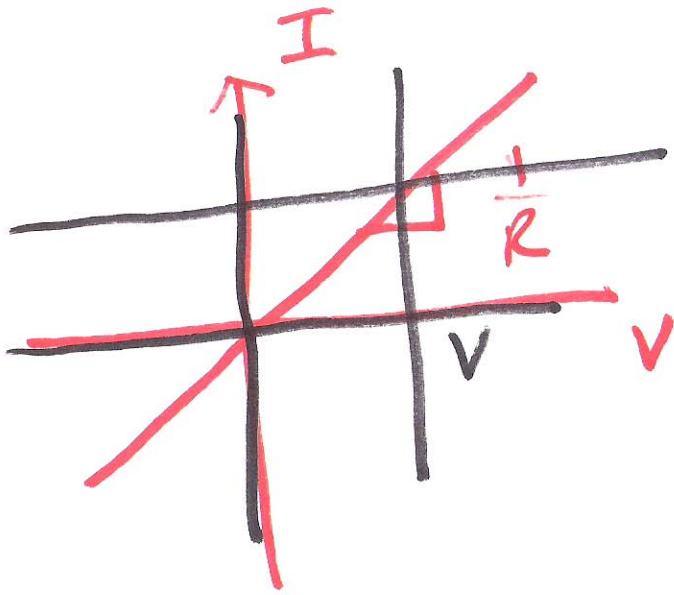
4)

3.91

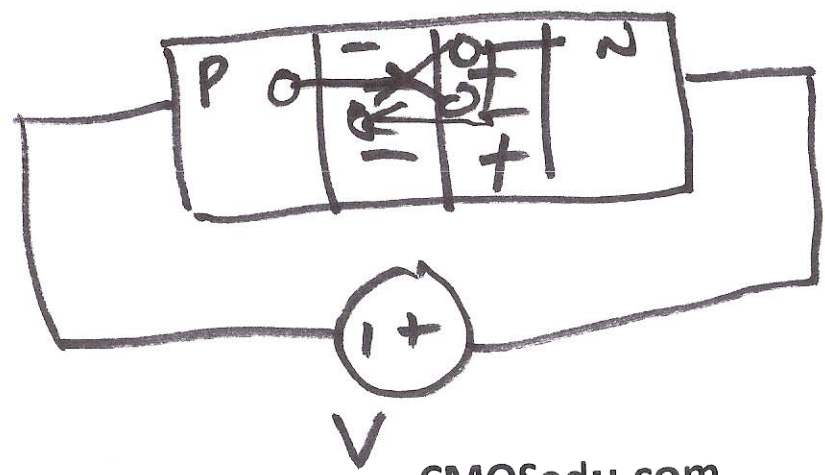
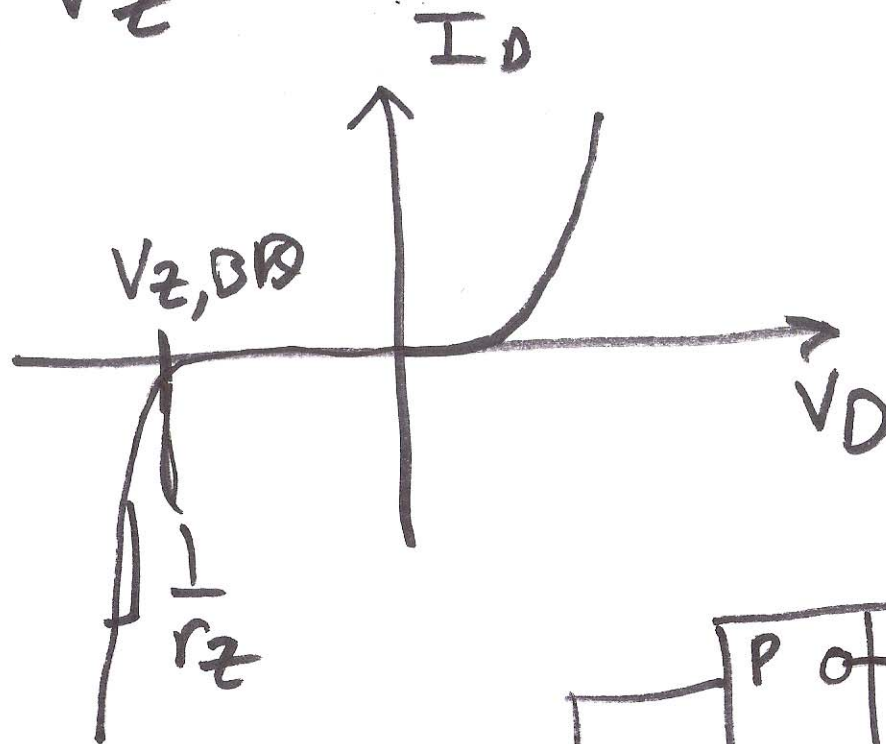
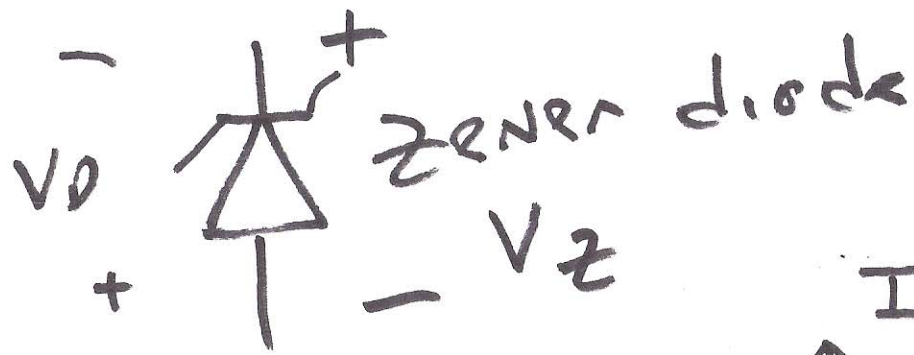


$$V_{avg} = \frac{\left((V_p - V_m) - V_R \right) \frac{3}{4} T + \left((V_p - V_m - V_R) - V_R \right) \frac{1}{4} T}{T}$$

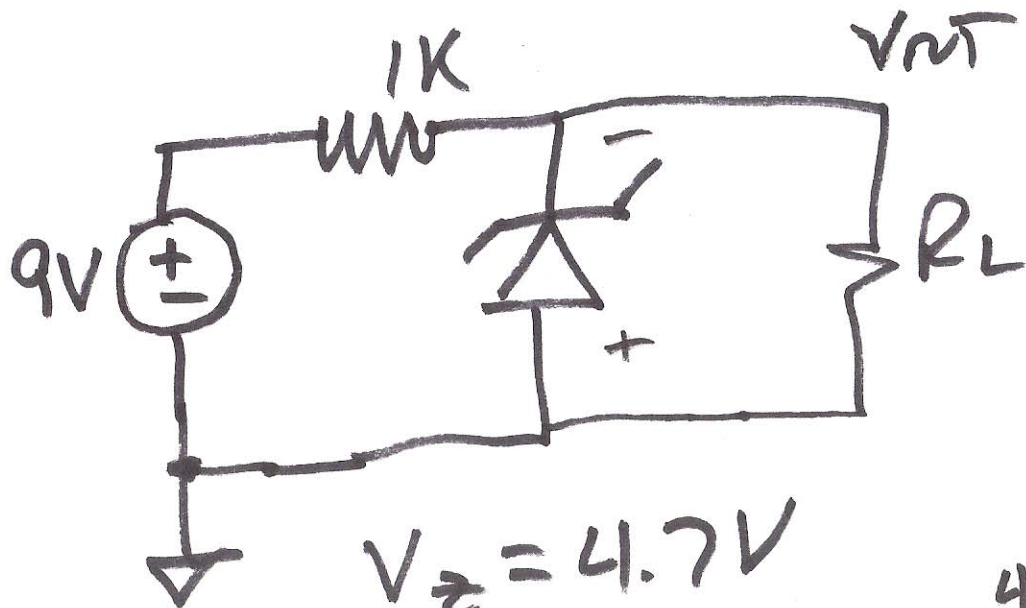
5)



67

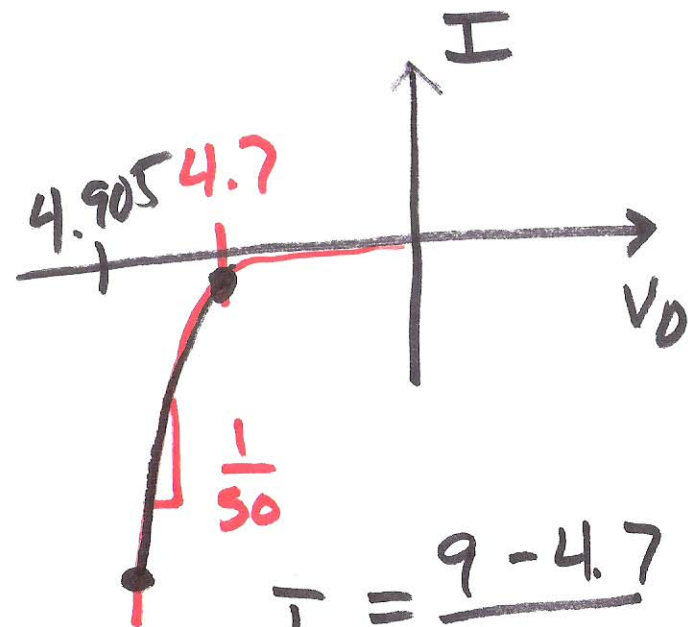


1)

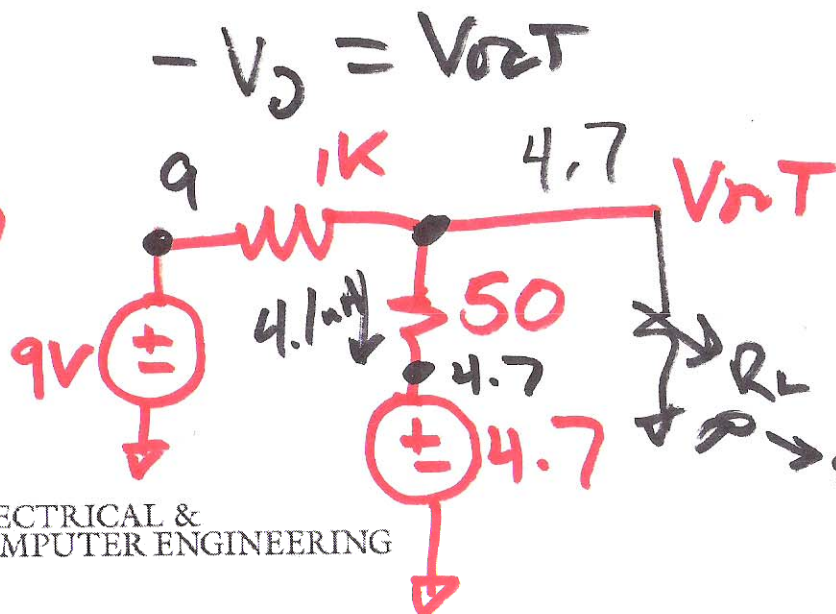


What min value
of \$R_L\$
for \$V_{out} \ge 4.7V\$

Quiz on Wednesday?
\$V_z = 4.7V\$
\$r_z = 50\Omega\$



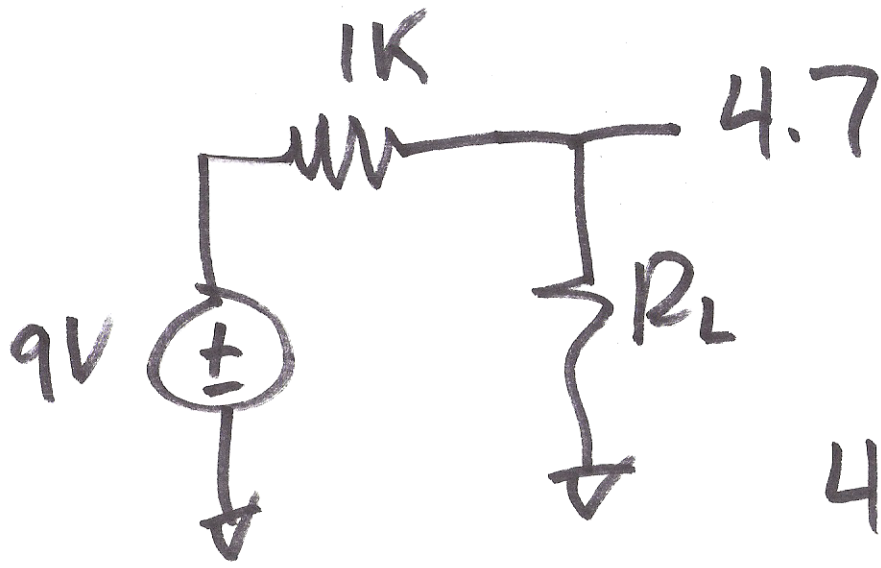
\$V_{out} = ?\$
\$R_L = \infty\$



$$I = \frac{9 - 4.7}{1,050} = 4.1mA$$

$$V_{out} = 4.1mA \cdot 50 + 4.7 = 4.905V$$

8)



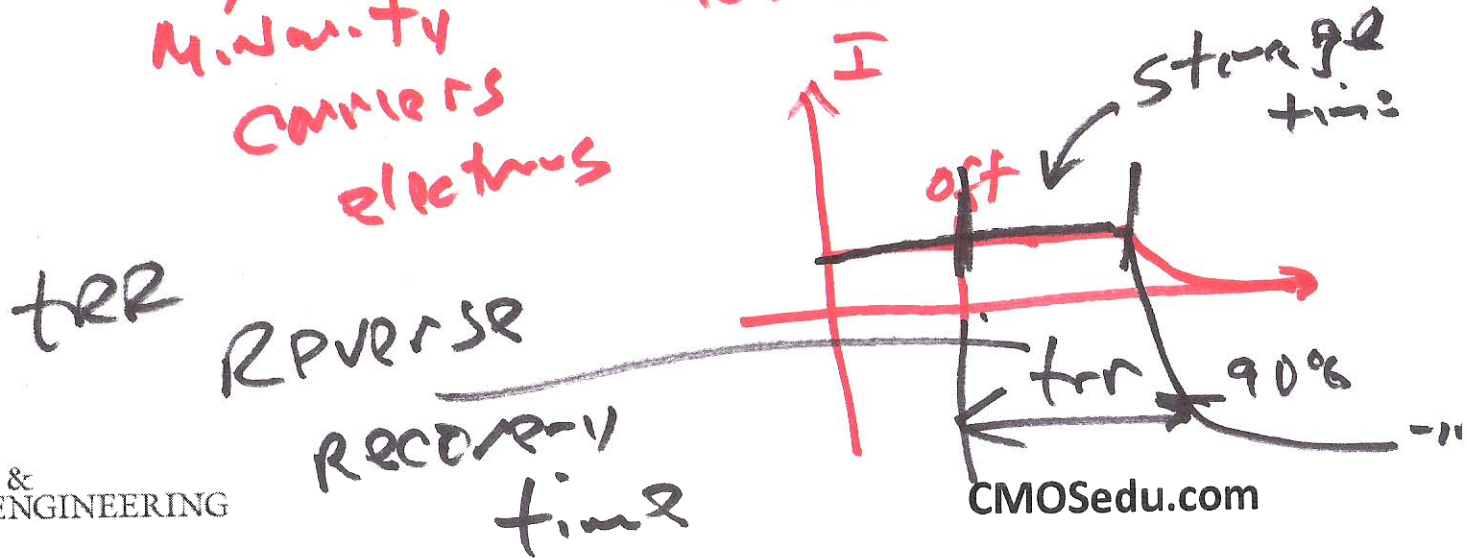
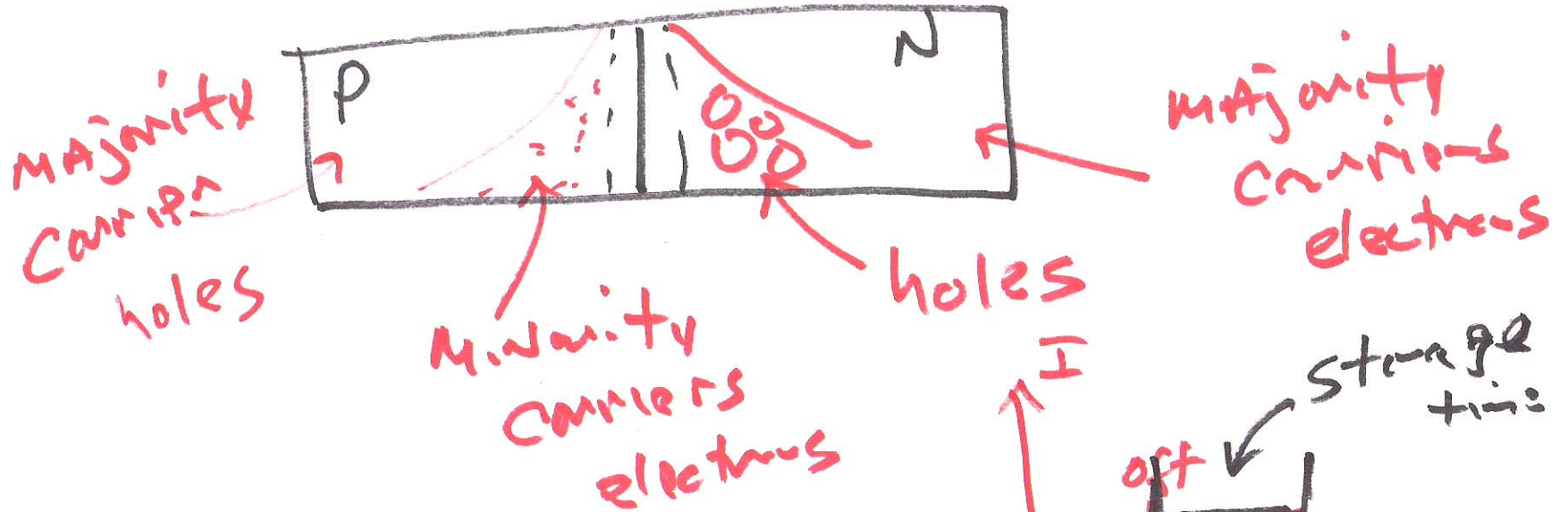
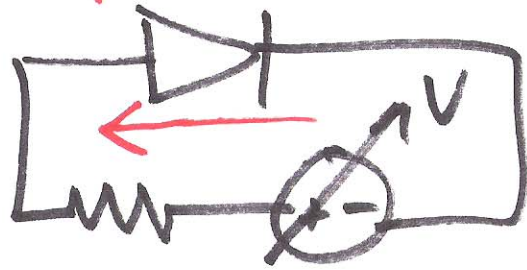
$$4.7 = 9 \cdot \frac{R_L}{1k + R_L}$$

Solve for R_L

a)

Diffusion Capacitance

+ 0.7V



10)