5.39 a)

$$I_d = (K_N)\left(V_{GS} - V_{TN} - \frac{V_{DS}}{2}\right)(V_{DS})(1 + \lambda V_{DS})$$

$= 8.25\,mA$

b) $= 10.23\,mA$

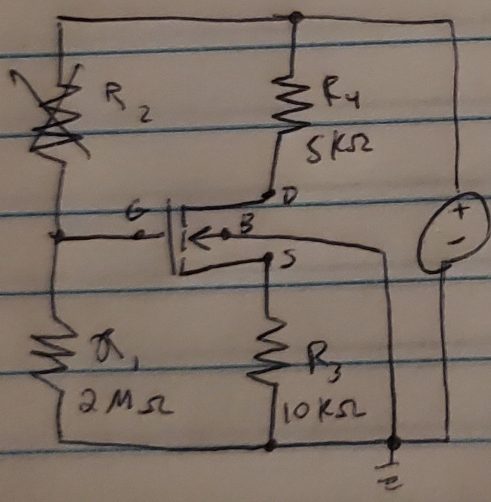
5.93 a) ~~$I_d = 2\left(\frac{W}{L}\right)(K_n)\left(V_{GS} - (V_{TO} + \gamma(\sqrt{2\phi_F - |V_{SB}|} - \sqrt{2\phi_F}))\right)(V_{DS} - \frac{V_{DS}^2}{2})(1 + \lambda V_{DS})$~~

$V_T = V_{TO} + \gamma\left(\sqrt{|V_{SB}| + 2\phi_F} - \sqrt{2\phi_F}\right)$

$V_{GS} = 2.5 \quad V_T = 2.87$ $I_d = 0\,A$

5) $I_d = 0\,A$

5.134



$I_D = K_N\left((V_{GS} - V_T)V_{DS} - \frac{V_{DS}^2}{2}\right)$ triode

or $\frac{K_N}{2}(V_{GS} - V_T)^2(1 + \lambda V_{DS})$ saturation

$K_N = -2\,mA/V^2 \quad V_{TN} = -4.5\,V$

$\frac{12 - V_D}{5000} = \frac{V_S - 0}{1000}$