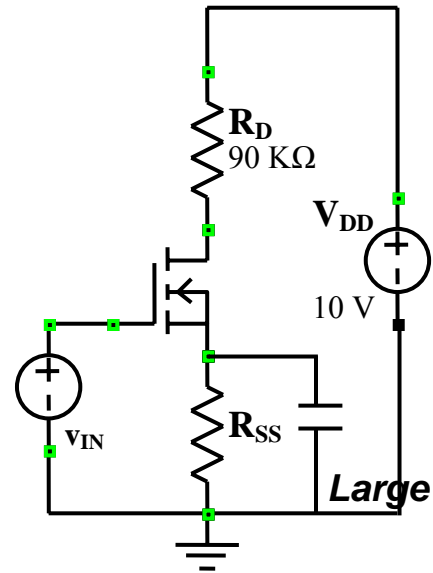


ECE255

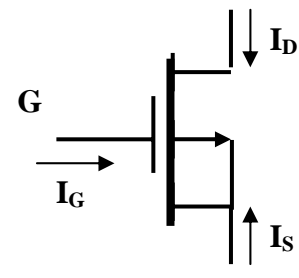
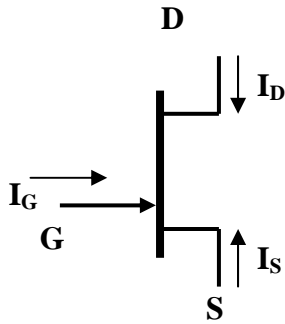
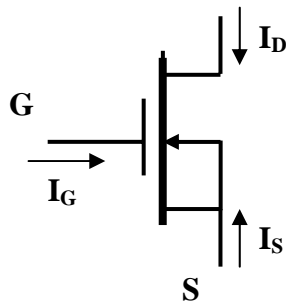
Homework # 8

8.x. $K_n = 150 \mu\text{A}/\text{V}^2$, $V_{tn} = 0.5 \text{ V}$, $\lambda_n = 0.04$, and $W/L = 6$;
 $v_{IN} = V_{GG} + 4 \times 10^{-3} \sin(10^4 t)$.

- (a) Design the operating point for $I_D = 50 \mu\text{A}$ and $V_{DS} = 3 \text{ V}$
 (b) Verify your operating point design.



8-y The transistors shown have $V_{Pn} = V_{tDn} = -0.5 \text{ V}$ or $V_{tDp} = 0.6 \text{ V}$. Determine the type of device and the region of operation of each and explain why you arrived at your answer.



$V_{DS} = 0.8 \text{ V}$, $V_{GS} = -0.4 \text{ V}$;

$V_{DS} = 1 \text{ V}$, $V_{GS} = -0.3 \text{ V}$;

$V_{DS} = -0.5 \text{ V}$, $V_{GS} = 0.5 \text{ V}$

8-z Design the inverter circuit shown for $V_{DS} = 0.2 \text{ V}$ when the input is high. The FET has $K_n = 400 \mu\text{A}/\text{V}^2$, $V_{tn} = 0.5 \text{ V}$ and $\lambda_n = 0$. v_{IN} is a pulse from 0 to 2.5 V and $V_{DD} = 3 \text{ V}$. Verify the design with SPICE.

