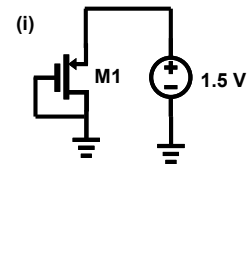
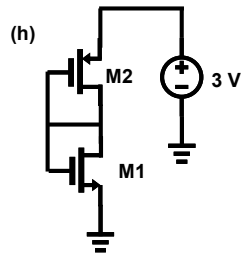
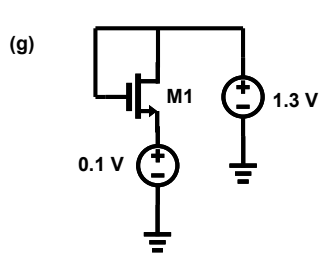
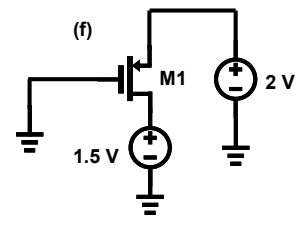
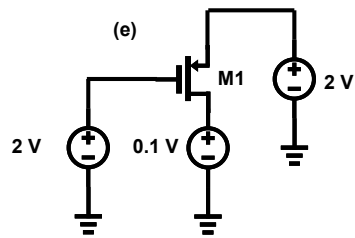
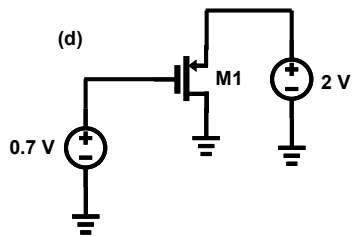
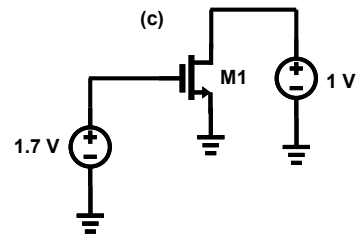
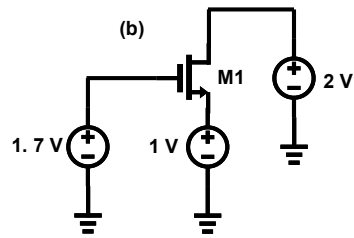
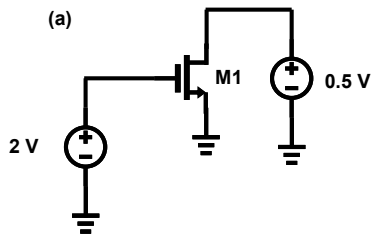


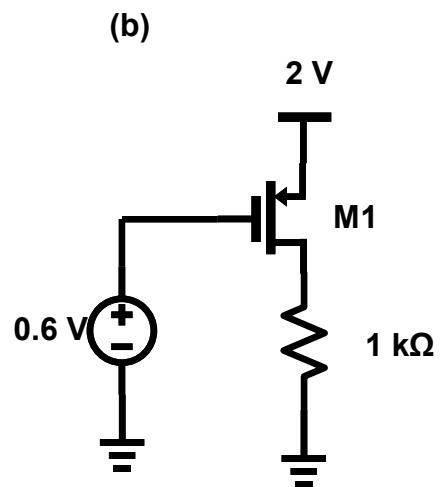
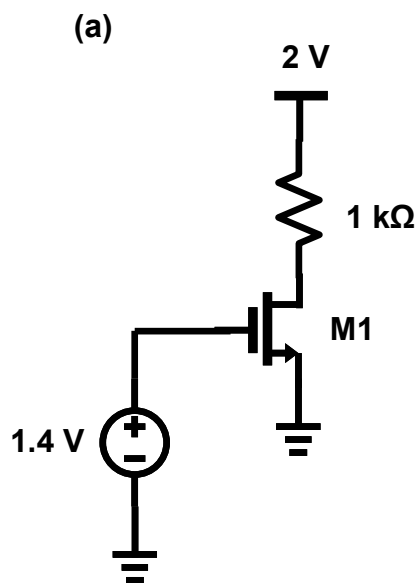
ECE 323

Homework 1

- 1) Determine the region of operation of M1 in each of the circuits below.
Assume $V_{THN} = |V_{THP}| = 1 \text{ V}$.

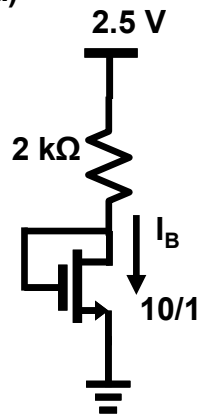


- 2) What value of W/L places M1 at the brink of saturation? $V_{\text{THN}} = |V_{\text{THP}}| = 1 \text{ V}$,
 $\mu_n C_{\text{ox}} = 100 \text{ uA/V}^2$ $\mu_p C_{\text{ox}} = 50 \text{ uA/V}^2$

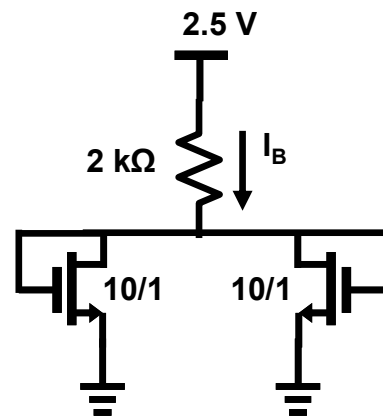


3) Determine I_B in the following circuits. Use parameters from problem 2.

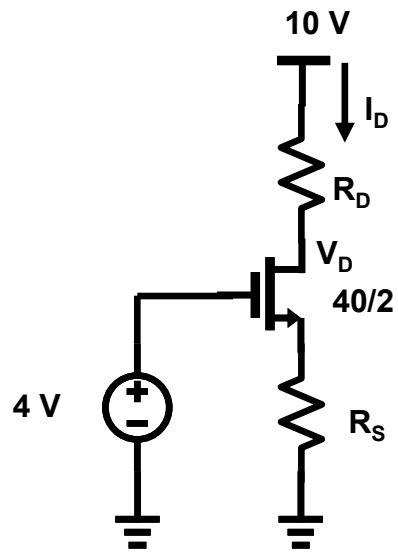
(a)



(b)



- 4) Design the circuits below such that $I_D = 2\text{mA}$ and $V_D = 5\text{V}$. $V_{\text{THN}} = 1\text{ V}$, $\mu_n C_{\text{ox}} = 100\text{ }\mu\text{A/V}^2$.



- 5) For the circuits in Fig 5, find values for the labeled node voltages and branch currents. Assume β to be very high and $|V_{BE}| = 0.7 \text{ V}$

