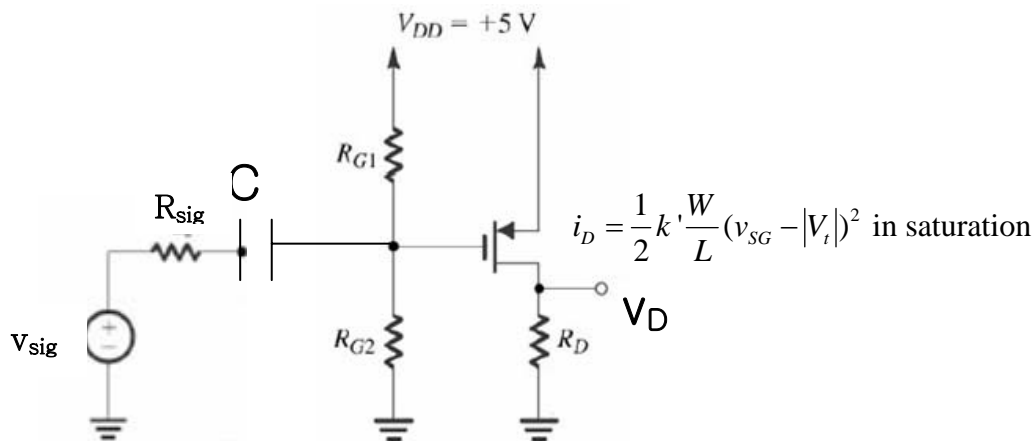


Quiz #1

March 19, 2007
Prof. Woo-Young Choi
Electronic Circuits II

Problem 1 (4)

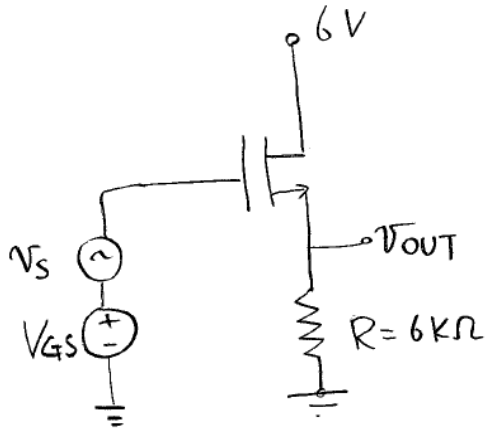
Consider the following amplifier circuit having a PMOS transistor with $V_t = -1\text{V}$, $k'(W/L) = 1\text{mA/V}^2$ and $\lambda = 0$. Assume C is very large so that the capacitor is open for DC signals. $R_{\text{sig}} = 10\text{k}\Omega$.



- (a)(2) Determine R_{G1} and R_{G2} so that the PMOS has g_m of 1mA/V . Use R_{G1} and R_{G2} values greater than $1\text{M}\Omega$ but less than $5\text{M}\Omega$. Assume the PMOS transistor is in saturation.
- (b)(2) Draw a small signal equivalent circuit for the above amplifier and determine the expression for the small signal voltage gain (v_d/v_{sig}).

Prob. 2 (6)

Consider a MOSFET amplifier circuit shown below. Assume the transistor has $v_T = 1\text{V}$, $k' = 100\mu\text{A}/\text{V}^2$, $W/L = 10$ and $r_o = \text{infinite}$. Ignore the body effect.



- (a)(2) Determine V_{GS} so that V_{OUT} (DC output voltage) = 3 V.
- (b)(2) Determine the numerical value for the amplifier output resistance.
- (c)(2) Determine the exact expression for amplifier voltage gain (v_{out}/v_s).