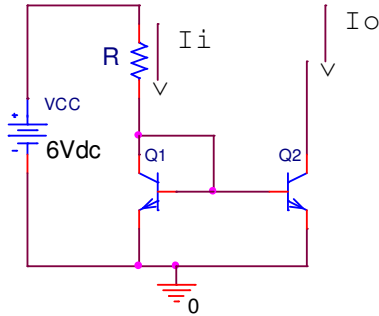


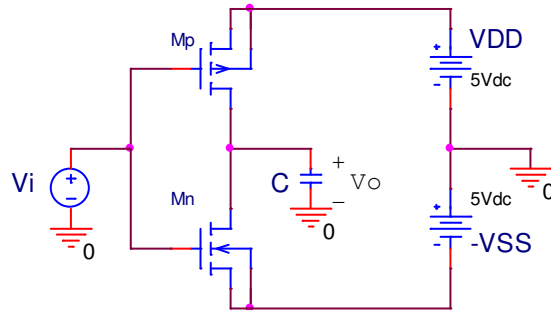
ENEE 303 Midterm Exam Make Up, Spring 2012, due in class W 04/04/12

80 points, take home, open book, open notes; your signature guarantees the work is your own.

- (15 points) Assuming identical transistors with their base-emitter diode governed by the base emitter saturation current, $I_s = 3E-16$, and having the forward beta, $B_f=120$, give the resistance, R , needed to give an output current of 6 milliAmps.



- (15 points) For the following inverter assume that M_p and M_n are fully complementary with Spice parameters $K_P=5E-5$, $|V_{TO}|=1.1$, $LAMBDA=0.12$, $C_{gs}=C_{gd}=12pFd$, and $W=L=8uM$. Find symbolically and numerically the small signal gain, $V_o/V_i(s)$ when loaded with the capacitor $C=22pFd$. Give also its zeros and poles.



- (50 points) The following circuit has the open circuit transfer function

$$V_1/V_o(s) = 1/[C_1 C_2 L R s^3 + C_2 L s^2 + (C_1 + C_2) R s + 1].$$

But when constructed the capacitors are replaced by inductors and the inductor by a capacitor

- Give then new $V_1/V_o(s)$.

Assume also that $R_1=R_i$ are very large and $K=R_f/R_1$.

- Give the new transfer function $V_o/V_i(s)$ as a ratio of two polynomials.

- Give the new conditions for sinusoidal oscillations and the new oscillation frequency as well as the poles of the transfer function V_o/V_i .

