

ENEE 303 Fall 2012 – Midterm Exam Continuation at Home  
 Due start of class Th 11/08/12

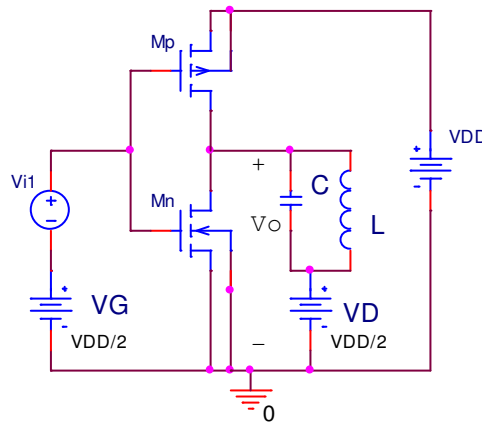
Open book open notes; 50 points total (to add to midterm score). Good luck

For the following problems  $V_{DD}=10V$ .

All transistors have  $K_P=4 \times 10^{-4}$ ,  $|V_{TO}|=1$ ,  $LAMBDA=0.01$ ,  $W/L=1$ ;  $C_{gs}=C_{gd}=10pFd$  (with  $V_{TO}>0$  for NMOS,  $<0$  for PMOS)

1. (25oints) For the following

- Find the transistors' bias drain currents.
- Draw the small signal equivalent circuit.
- Give symbolically the transfer function  $V_o/V_i(s)$ .
- Assume  $C=C_{gd}$  and from c) find symbolically and numerically, when  $L=10nHy$ , the poles and zeros of  $V_o/V_i(s)$ .



2. (25ints)

For the following circuit

- Find  $V_G$  and  $V_o$  for a source current of  $I_S=2mA$  and then give  $g_m$  and  $g_o$ .
- Replace the  $V_G$  battery so that only one battery,  $V_{DD}$ , is used.
- For the revised circuit of b) draw the small signal equivalent circuit including  $C_{gs}$  &  $C_{gd}$  using generic symbols (= without numerical values).
- Find the small signal input voltage to output drain current gain,  $i_d/v_i(s)$ , and give its poles and zeros (all symbolically).

