EE338L
Homework 3
Due Tu 3/6/07

Use the following transistor parameters:
NFET: Kp=150uA/V^2, Vt=0.7V, lambda=0.03
PFET: Kp=50uA/V^2, Vt=0.8V, lambda=0.03

Problem 1:
Calculate the operating point for the two circuits.
Then calculate the small signal gain.

Problem 2:
Given a 10uA current source, design a current sink that can sink 100uA, has output impedance of the order of gm*ro^2 and works down to Vout=0.4V.
Then design a current source that can source 100uA, has output impedance of the order of gm*ro^2 and works up to Vout = VDD-0.4V.

Problem 3:
Start with a 10uA current source. Design a differential pair such that the transconductance G=deltaIout/Vdm=1mS.
Vcmin can range from 1V to 1.5V. Make sure that the all devices are in saturation for vcmin=1V. What is the minimum vout for vcmin=1.5V

Problem 4: calculate the currents I1, I2, I3, I4, I5 assuming that all devices are in saturation. Exceptions may be M1 and M2 – decide and justify.
All devices are identical, the multiplier M indicates how many unit devices are hooked up in parallel.