PROBLEM SET #4

Issued: Friday, September 20, 2019
Due: Friday, September 27, 2019, 12:00 noon via Gradescope.

1. Sedra & Smith, Problem 2.98
2. Sedra & Smith, Problem 2.119
3. Sedra & Smith, Problem 2.120
4. Sedra & Smith, Problem 3.4
5. In the following circuit, find the value of $R_{OS}$ to cancel out the offset due to amplifier bias currents ($I_B$).

6. The op amp in the following circuit has an open-loop gain of 1000, an offset voltage of 1mV, and an input-bias current of 100nA ($R_1=2\, \Omega$, $R_2=100\, \Omega$, $R_3=1\, \Omega$).
   (a) What would be the output voltage for an op amp with no offset?
   (b) What is the actual output voltage for the worst-case polarity of offset voltage?
   (c) What is the percentage error in the output voltage compared to the ideal output voltage?
7. A diode has $I_S = 10^{-16} A$ and $n = 1$.
   (a) What is the diode voltage if the diode current is $100 \mu A$?
   (b) What is the diode voltage if the diode current is $10 \mu A$?
   (c) What is the diode current for $v_D = 0$?
   (d) What is the diode current for $v_D = -0.05 V$?
   (e) What is the diode current for $v_D = 0.8 V$?