NAME	
ID#	

ECSE 330

INTRODUCTION TO ELECTRONICS

(Winter 2008)

Quiz 1 Set A

Monday January 28, 2008

Time Allowed: 45 Minutes

Total Marks: 20 Marks

Instructions:

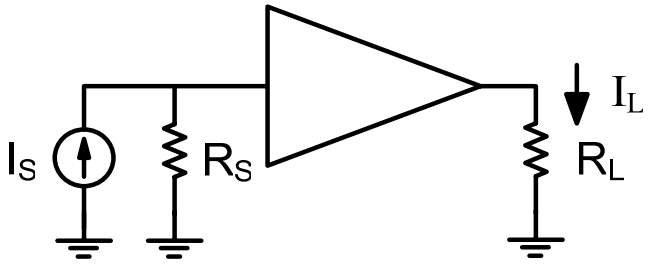
- Answer all questions on the question sheets provided.
- Show all your work to receive full credits.
- Feel free to request additional blank paper if needed.

Question	Marks
Q1	**/ 14**
Q2	**/ 6**
Total	**/ 20**

Question 1)

(a) Sketch the circuit model of a current amplifier, clearly label all components. (1 pt)

(b) As shown below, the current amplifier in part (a) is connected between a current source I_s with a source resistance R_s and a load R_L.



Find an expression for the current gain of the amplifier (I_L/I_s). (4 pt)

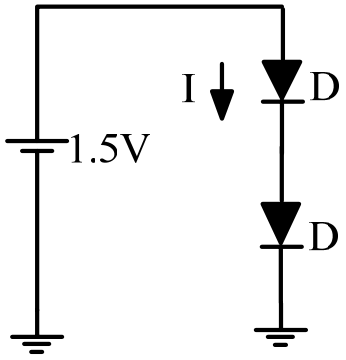
(c) Calculate the value of the current gain found in part (b) assuming that:
R_s=1M Ω, R_L=100 Ω, R_{in}=100 Ω, R_o=1M Ω, and A_{SI}=100. (1 pt)

(d) Modify the amplifier circuit of part (b) by adding a capacitor at the output of the current amplifier. Place the capacitor such that the overall transfer I_L/I_s function is LOWPASS. Draw the circuit of the modified amplifier. (2 pt)

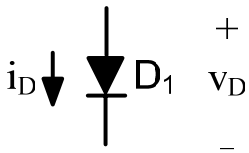
(e) Calculate the value of the capacitance in part (d) for a cutoff frequency of 100MHz. (4 pt)

(f) Draw the bode <u>magnitude</u> and <u>phase</u> plots of (I_{out}/I_s) for the amplifier of section (d). (2 pt)

Question 2) In the following circuit all diodes are identical with $I_s=10^{-9}$A and n=2. Use exponential model for diodes to find I (assume that the diodes operate in strong forward bias region). (6 pt)



DIODES:



$$i_D = I_S(e^{\frac{v_D}{nV_T}} - 1)$$