

Name: \_\_\_\_\_

Student ID #: \_\_\_\_\_

**EECS 170A Section B  
Homework #4**

HW will be collected in DISCUSSION ONLY.

Do not turn your HW in anywhere else, or it will not be accepted.

You are encouraged to turn it in at your own discussion section.

You may turn it in at any discussion section.

Last option to turn in: Right after Wednesday discussion section November 30, 2005.

DUE: 1 PM Wednesday, November 30, 2005.

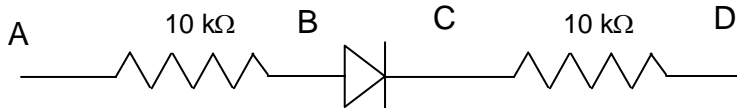
Please *staple* this sheet to the front of your homework.

1	2a	2b	2c	2d	2e	2f	2g	2h	2i	2j	Total
/42	/6	/6	/6	/6	/6	/6	/6	/6	/6	/4	/100

1) In class we found:

$$I = I_0 \left( e^{qV_{diode}/kT} - 1 \right)$$

Take  $I_0 = 10^{-14}$  A. For the circuit shown, fill in the following table:

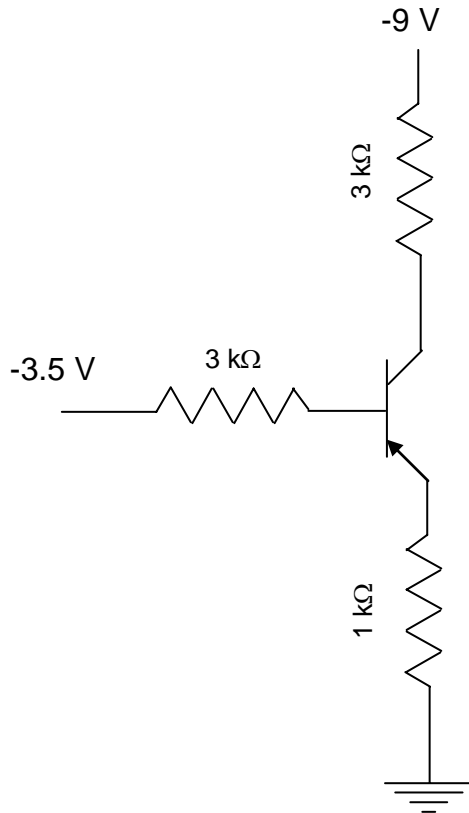


$V_{AD}$ (V)	$V_{diode}$ (V) = $V_{BC}$	$I_{AD}$ (A)
0		
0.5		
1		
1.5		
2		
2.5		
3		
3.5		
4		
4.5		
5		
5.5		
6		
6.5		
7		
7.5		
8		
8.5		
9		
9.5		
10		

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- 2) For the circuit shown below, find  $I_B$ ,  $I_E$ ,  $I_C$ ,  $V_C$ ,  $V_B$ ,  $V_E$ ,  $V_{BE}$ ,  $V_{CE}$ ,  $V_{BC}$  defined in figure 10.2 (which one, a or b?) of the text. Hints: the BE voltage drop is about 0.6 V. Take  $\beta = 100$ . Then  $I_C = 100 I_B$ . The rest is just applications of Kirchoff's current and voltage laws. Is the transistor biased in active mode?



Please fill out table on this paper. Show your work on attached paper. As usual, no units, no credit.

$I_E =$	
$I_B =$	
$I_C =$	
$V_E =$	
$V_B =$	
$V_C =$	
$V_{BE} =$	
$V_{CE} =$	
$V_{BC} =$	
Active? Y or N	