Name:_____

Student ID #:_____

EECS 170A
Homework #4
DUE: December 5, 2007 in discussion.

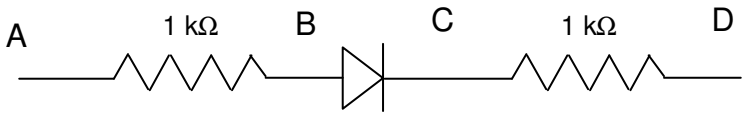
Please *staple* this sheet to the front of your homework.

1	2	Total
/50	/50	/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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Now do the same, assuming the resistors are 1 MΩ instead of 1 kΩ.

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		

How much does this effect the “on voltage” by?

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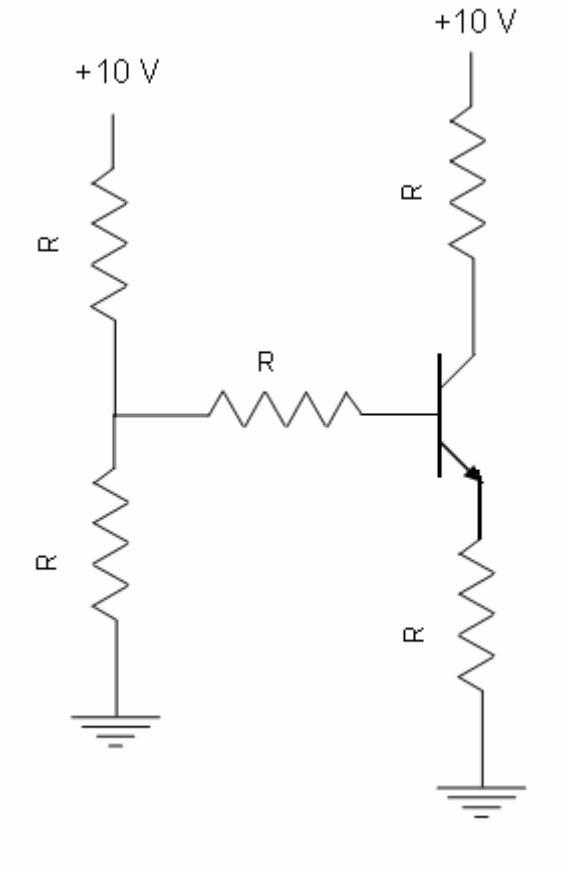
2) For the circuit shown below, find I_B, I_E, I_C, V_C, V_B, V_E, V_{BE}, V_{CE}, V_{BC} defined in figure 10.2 (which one, a or b?) of the text. Hints: the BE voltage drop is about 0.6 V. Take $\beta = 100$. Then $I_C = 100\ I_B$. The rest is just applications of Kirchoff's current and voltage laws. Is the transistor biased in active mode? Assume R = 1 kΩ.



I_E=	
I_B=	
I_C=	
V_E=	
V_B=	
V_C=	
V_{BE}=	
V_{CE}=	
V_{BC}=	