Name:_____

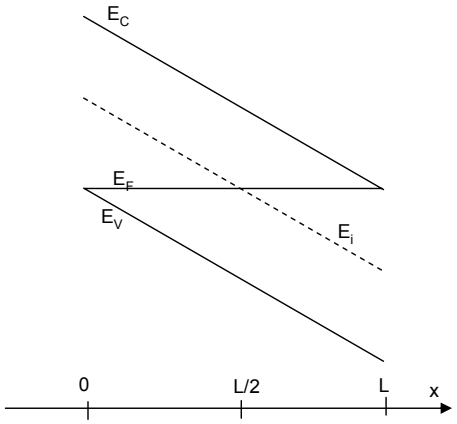
Student ID #:_____

ECE 113A
Homework #3
Due 10 A.M. Wednesday, October 29, 2003

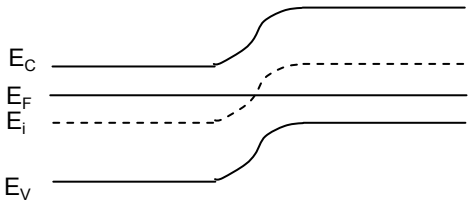
Please *staple* this sheet to the front of your homework.

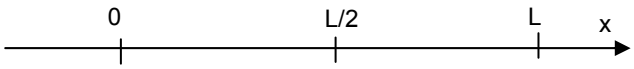
1a	1b	1c	1d	2a	2b	2c	2d	3a	3b	3c	3d	4a	4b	4c	4d	43	Total
/5	/5	/5	/10	/5	/5	/5	/10	/5	/5	/5	/10	/5	/5	/5	/5	/5	/100

1) Answer a-d for the figure shown below:
   a. Do equilibrium conditions prevail? How do you know?
   b. Sketch the electrostatic potential (V) inside the semiconductor as a function of x.
   c. Sketch the electric field ($\mathscr{E}$) inside the semiconductor as a function of x
   d. Roughly sketch n and p versus x.



2) Answer a-d for the figure shown below:
   a. Do equilibrium conditions prevail? How do you know?
   b. Sketch the electrostatic potential (V) inside the semiconductor as a function of x.
   c. Sketch the electric field ($\mathscr{E}$) inside the semiconductor as a function of x
   d. Roughly sketch n and p versus x.





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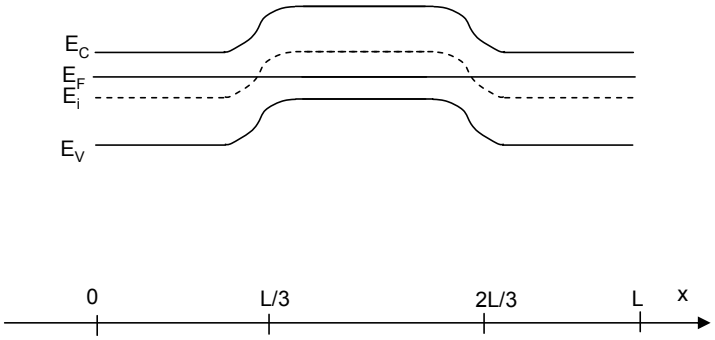
3) Answer a-d for the figure shown below:
   a. Do equilibrium conditions prevail? How do you know?
   b. Sketch the electrostatic potential (V) inside the semiconductor as a function of x.
   c. Sketch the electric field ($\mathscr{E}$) inside the semiconductor as a function of x
   d. Roughly sketch n and p versus x.



4) For Si at 300 K, calculate E_C-E_F and sketch E_C, E_F, E_i, and E_V as in figure 2.18 of the book for the following cases:

   a. $N_D = 10^{17}$ cm^{-3}; $N_A << N_D$.
   b. $N_D = 10^{15}$ cm^{-3}; $N_A << N_D$.
   c. $N_A = 5\text{x}10^{17}$ cm^{-3}; $N_D << N_A$.
   d. $N_A = 10^{14}$ cm^{-3}; $N_D << N_A$.
   e. $N_A = N_D = 0$.