Name:_____

Student ID #:_____

ECE 113A
Homework #5
Due 10 A.M. Wednesday, November 19, 2003

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

A voltage V_A of 0.4144 V is being applied to a step junction with n and p side dopings of $N_A=10^{15}cm^{-3}$ and $N_D=10^{15}cm^{-3}$, respectively. $n_i=10^{10}cm^{-3}$.

1. Calculate p on the p side at the interface. (6 pts)
2. Calculate p on the p side 10 diffusion lengths away from the interface (6 pts)
3. Calculate p on the p side 20 diffusion lengths away from the interface (6 pts)
4. Calculate p on the p side 30 diffusion lengths away from the interface (6 pts)
5. Calculate n on the p side at the interface (6 pts)
6. Calculate n on the p side 10 diffusion lengths away from the interface (6 pts)
7. Calculate n on the p side 20 diffusion lengths away from the interface (6 pts)
8. Calculate n on the p side 30 diffusion lengths away from the interface (6 pts)
9. Calculate p on the n side at the interface. (6 pts)
10. Calculate p on the n side 10 diffusion lengths away from the interface (6 pts)
11. Calculate p on the n side 20 diffusion lengths away from the interface (6 pts)
12. Calculate p on the n side 30 diffusion lengths away from the interface (6 pts)
13. Calculate n on the n side at the interface (6 pts)
14. Calculate n on the n side 10 diffusion lengths away from the interface (6 pts)
15. Calculate n on the n side 20 diffusion lengths away from the interface (6 pts)
16. Calculate n on the n side 30 diffusion lengths away from the interface (6 pts)
17. Make a dimensioned log(p or n) versus x sketch of both the majority and minority carrier concentrations in the quasineutral regions of the device. (4 pts)

WRITE YOUR ANSWERS TO 1-16 IN THE TABLE BELOW: (SHOW YOUR WORK ON ATTACHED PAPER)

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