ELEG 340: Solid-State Electronics, Fall 2008

Homework #6 - due Tuesday, 28 October 2008, at the beginning of class

1. Problem 4.17, p. 151 of Streetman-Banerjee, 6th edition. Hint: Eqn. (4-44) does not include recombination, so you must multiply by the e$^{-t/\tau}$ factor. Easiest to use a ratio of the two times.

2. Problem 5.7 (a) only; for $N_A = 10^{14}$ cm^{-3} only, and for the N_D's listed, do the odd numbered exponents only.

3. Problem 5.9, p. 243 of Streetman-Banerjee, 6th edition.

4. Problem 5.10, p. 243 of Streetman-Banerjee, 6th edition. Hint: to find x_{no} and x_{po}, first find W_{dep} and then use the doping ratio factors.

5. Problem 5.12, p. 243 of Streetman-Banerjee, 6th edition.

6. Problem 5.14 (a) only, p. 243 of Streetman-Banerjee, 6th edition. Hints: by "junction capacitance", they mean what we call "depletion capacitance". To find φ_{bi}; first find φ_n on the n-side from N_D, and then assume that φ_p on the p-side is just $(E_i-E_v)/q$, i.e. just half the bandgap voltage, which is a good approximation for a p$^+$ region. Then find W_{dep} for this built-in potential and the given reverse bias.

   Homework assignments will appear on the web at:
http://www.ece.udel.edu/~kolodzey/courses/eleg340f08.html

   Note: On each homework and report submission, please give your name, the due date, assignment number and the course number.