Homework 8
EE 362 Electronic, Magnetic, & Optical Properties of Materials (Spring 2024)
Wednesday, March 27, 2024

1) 8.2 First, calculate the thermal equilibrium minority carrier concentrations for the n & p regions.
2) 8.7 First, calculate J_s.
3) 8.16 First, calculate the minority thermal equilibrium carrier concentrations and diffusion lengths for the n & p regions. [Hint: e) find total current & hole current at $x = x_n + L_p/2$, subtract to get electron current.]
4) 8.40 a) Plot C_j & C_d (pF) for $0 \le V_a \le 0.75$ V. Then, plot C_j (pF) for $-10 \le V_a \le 0.75$ V. For both plots use a vertical scale of 0 to 25 pF. Also, tabulate C_j & C_d for V_a = -8, -4, 0, 0.4, 0.5, and 0.6 V. [Three columns- V_a, C_j, & C_d.] Depletion capacitance ≡ junction capacitance C_j. See **Note**. Recommend use of MATLAB.
5) 8.43 See **Note.**
6) 8.46

Due Friday, April 5, 2024.

Notes:

- Carry *at least* 6 significant figures on constants/parameters in calculations. Give answers with 4-5 significant figures.
- If a solution requires the use of a graph, include the graph with work shown.
- Read **Note** at beginning of PROBLEMS section on page 323.