
Physics of Semiconductors and Nanostructures
ECE 4070 / MSE 6050, Spring Semester 2019
Assignment 6

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Policy on assignments: Please turn them in by 5pm of the due date in the mailbox outside Phillips 426 marked for ECE 4070/ MSE 6050.

The due date for this assignment is **Monday, April 29th, 2019**.

General notes: Present your solutions *neatly*. Do not turn in rough unreadable worksheets - learn to **take pride in your presentation**. Show the relevant steps, so that partial points can be awarded. BOX your final answers. Draw figures wherever necessary. Please print out this question sheet and staple to the top of your homework. Write your name and email address on the cover.

Solve the following exercise problems from the course notes posted on the class website.

Problem 13.1 [Effective Mass Methods: Doping and Quantum Dots]

Problem 13.2 [Quantum Well Heterostructures]

Problem 14.1 [The deep-acceptor problem and the 2014 Physics Nobel Prize]

Problem 14.2 [Doping a Semiconductor above the Mott Criteria]

Problem 14.3 [Semiconductor Heterojunctions and Band Offsets: Know what you are talking about]

Problem 14.5 [Energy Band Diagrams of A Heterostructure Bipolar Transistor (HBT)]

Problem 15.1 [Quantum current flow and saturation in semiconductors]

Problem 16.1 [Quantum Current across a Schottky Junction]