Physics of Semiconductors and Nanostructrures
ECE 4070 / MSE 6050, Spring Semester 2019
Assignment 3

Debdeep Jena (djena@cornell.edu)
Departments of ECE and MSE, Cornell University

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 **Friday, March 15th, 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 5.6 [Quantum 2D Free Electrons in a Magnetic Field]
Problem 5.7 [Electric Current Flow in Semiconductor Crystals]
Problem 5.8 [To gap or not to gap, that is the question]
Problem 6.1 [Matrix solutions of Quantum Mechanical Problems]
Problem 6.4 [Solutions for general 2x2 Matrices]
Problem 7.2 [Energy gap from a square wave potential]
Problem 8.1 [Miscellaneous Questions on Bandstructure]
Problem 8.2 [Electrons get their bands and gaps]