Physics 3313, Homework #1 (due 2/1)

P1 In a simple cubic lattice, what is the angle between the following planes: (a) (100) and (110); (b) (111) and (110)?

P2 In a face-centered cubic lattice with the lattice constant 1 Å, calculate the surface density of atoms on the (a) (110) plane, (b) (111) plane.

P3 GaAs has the zincblende ( sphalerite) lattice structure with the lattice constant 5.65 Å. What is the minimum distance between (a) two Ga atoms, (b) a Ga atom and an As atom?

P4 If $2.5 \times 10^{14}$ boron atoms per cm$^3$ are added to silicon as a substitutional impurity, determine what fraction of the silicon atoms are displaced in the lattice. The lattice constant of Si is 5.43 Å.