Tutorial 9 (Physics 2-15B11PH211)

Assignment 6: Show that FCC crystals are more closely packed than BCC crystals.

1. Write the miller indices of different planes of the family of {1 0 0 }. **[CO1]**

2. Find the Miller Indices of the plane that intercepts $\vec{a}$, $\vec{b}$, and $\vec{c}$ axes at 3 A^0, 4 A^0, and 3 A^0, respectively, in a tetragonal crystal with c/a = 1.5. **[CO3]**

3. A plane makes intercepts of 1 A^0 and 2 A^0 on $\vec{a}$ and $\vec{b}$ axes respectively, but parallel to $\vec{c}$ axis. Find Miller Indices if a:b:c is 3:2:1. **[CO3]**

4. The interatomic separation of Pb crystal having fcc structure is 3.5 A^0, calculate the number of atoms in 1 mm^2 area of (100) plane. **[CO4]**

5. From the X-rays diffraction (XRD) data, Fe is found to have a cubic cell parameter of 2.87 A^0. Its density and mass are 7870 km/m^3 and 55.85 amu, respectively. Find out the Bravias lattice structure of Fe and interatomic separation of Fe atoms. **[CO4]**

6. Calculate the packing fraction in **hexagonal close-packed (**HCP) crystal lattice. **[CO2]**

7. A BCC crystal is used to measure the wavelength of some X-rays. The Bragg's diffraction angle for the reflection from (110) plane is 20.2^0. Calculate the wavelength of X-rays if the lattice constant of the crystal is 3.15 A^0. **[CO4]**