YTU FACULTY OF CHEMICAL AND METALLURGICAL ENGINEERING

DEPARTMENT OF BIOENGINEERING

2023-2024 SPRING SEMESTER

HOMEWORK-2

1. If the atomic radius for Pb:0.175 nm , find the volume of the unit cell. (Pb is FCC)

2. A hypothetical metal has the simple cubic crystal structure shown in figure. 1 If its atomic weight is 70.4 g/mol and the atomic Radius is 0.126 nm, compute its density.
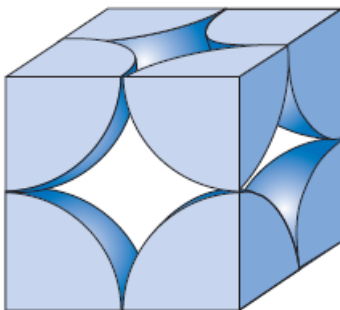

Figure. 1 Hard-sphere unit cell representation of the simple cubic crystal structure.

3.a) Derive planar density expressions for FCC (100) and (111) planes in terms of the atomic radius R.

b) Compute and compare planar density values for these same two planes for nickel.

4.

a) Derive linear density expressions for BCC [110] and [111] directions in terms of the atomic radius R.

b) Compute and compare linear density values for these same two directions for tungsten.

5. Within a cubic unit cell, sketch the following directions

      a) $[\bar{1}10]$ b) $[\bar{1}\bar{2}1]$ c) $[0\bar{1}2]$

6. What are the indices for the two planes drawn in the sketch below?
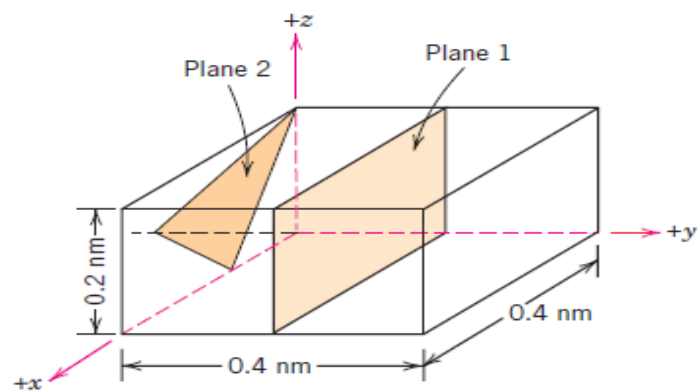
7) Determine the Miller indices for the planes shown in the following unit cell: