

**Assignment Chapter 3**

1. Prove the following correlation
  - a. BCC has an APF of 0.68 and that  $a = 4R\sqrt{3}$
  - b. FCC has an APF of 0.74 and that  $a = 2R\sqrt{2}$
2. Listed in Table 1 below are the physical properties data for three hypothetical alloys namely A, B, and C. Based on the information given, examine whether its crystal structure is face-centered cubic, body-centered cubic, or simple cubic. Justify your answer.

Table 1: Properties data for three alloys

Alloy	Atomic Weight (g/mol)	Density (g/cm <sup>3</sup> )	Atomic radius (nm)
A	43.10	6.40	0.122
B	184.40	12.30	0.146
C	91.60	9.60	0.137

3. Physical properties of Magnesium (Mg):

Crystal structure : Hexagonal close-packed  
 $c/a$  ratio : 1.624  
Density : 1.74 g/cm<sup>3</sup>  
Atomic number : 12  
Atomic mass : 24.305 amu

Based on the given information above, compute the atomic radius for Mg.