



- h. Classify materials based on their resistivity (hint: Three groups of materials)? What is unique about semiconductors?
2. The lattice constant of Ge at room temperature is  $a = 5.65 \text{ \AA}$ . Determine the number of Ge atoms/cm<sup>3</sup>. Determine the mass density of Ge in g cm<sup>-3</sup> (Use the fact that one mole of Ge weighs 72.6 g and contains  $6.02 \times 10^{23}$  atoms.)
3. In terms of the lattice constant  $a$ , what is the distance between nearest-neighbor atoms in:  
a. a bcc lattice?  
b. In an fcc lattice?
4. A crystalline lattice is characterized by the cubic unit cell pictured below. The cell has a single atom positioned at the center of the cube (Problem 1.11 in textbook).  
a. What is the name of the lattice generated by the given unit cell ?  
b. Determine the number of atoms per cm<sup>3</sup> in the crystal if the lattice constant  $a$  is 0.5 nm.

