HW# 5 CHEM 281 Chapter 3. Metallic Structure Name:_____
Key Questions (relatively simple to answer using the Focus Information)

1. What are the differences in the structures of following solids? a) Na(s):

   b) CO_2(s)-dry ice:

   c) C(s)-diamond:

   d) $CaCO_3$(s)-calcite

2. What is a crystalline material? How is C(s)-diamond different from C(s)-amorphous?

3. What is the **coordination number** of a metal atom in a closed packed solid?

4. Draw a simple cubic (SC) unit cell and label its axes and angles?

5. Draw a crystalline lattice with three simple cubic unit cells in all three directions, a, b, c.

6. What general unit cell dimensions for:
   a) Orthorhombic: a = b = c= α, = β, = γ =
   b) Rombohedral: a = b = c= α, = β, = γ =
   c) Monoclinic: a = b = c= α, = β, = γ =
7. How is simple a cubic unit cell is modified to create following crystal system?
   a) Triclinic:

   b) Rombohedral:

8. What are seven crystal systems?

a)	e)
b)	f)
c)	g)
d)	
h)	

9. Draw pictures of AAAAA.. **lose packing** to show how a simple cubic (SC) unit cells are created.

10. Draw pictures of ABABABAB.. **lose packing** to show how a body centered cubic (BCC) unit cells are created.

11. Draw pictures of ABABABAB.. **close packing** to show how a hexagonal closestpacked (HCP) unit cells are created.

12. On the model provided for **close packed** ABCABCABC.., identify the cubic closestpacked (CCP-FCC) unit cell.

13. Draw the 5 main types of Bravais Lattices and how they are distributed among crystal systems:

Bravais Lattices	Crystal systems:
a) P	
b) I	
c) F	
d) C	
e) R/P	
Total Bravis Unit Cells:	

14. How do you calculate the packing efficiency (52%) of cubic (SC)?

15. Calculate the number of atoms in a cubic unit cell:

a) Simple cubic (SC):

b) Body-centered cubic (BCC)

c) Cubic closest-packed (CCP-FCC)

16. Draw a structure of a metal to show crystal dislocation?

17. How is grain structure of metallic solids affected by heating , tamper and cooling?

18. Describe following alloys:
    a) Stainless steel:

    b) Jewelry gold:

    c) Dental amalgams

19. What properties are changed as an alloy is formed from a pure metal?

20. What is an amalgam?