Chem I Name _____

Date _____ Per _____

Worksheet # C23 : The Three Kinds of Chemical Bonds

Directions: Use your textbook (Modern Chemistry) to make your way through the following questions.

I. Metallic Bonding: bonds between **metals** and **metals**. Pages 181-182

1. What makes metals such good conductors of electricity? _____

_____

2. Consider the highest (outermost) energy levels of metals.

a. Are there many or few electrons in the outermost energy levels? _____

b. Which metals contain many vacant *d* orbitals in the energy level just below their outermost energy level? _____

c. What is the result of the overlapping of vacant orbitals in metals? _____

_____

_____

d. Use the word “delocalized” and the phrase “sea of electrons” in a sentence that makes sense. _____

_____

3. Define **metallic bonding**: _____

_____

4. In the space below make a rough sketch of the crystal structure of solid sodium

5. Define:

a. Malleability: _____

_____

b. Ductility: _____

_____

II. Ionic Bonding: bonds between **metals** and **non-metals**. Pages 176-178

6. What is an ionic compound? _____

_____

7. The chemical formula of an ionic compound represents _____

_____

a. Which of the following is <u>not</u> correctly written to represent an ionic compound?

circle one: LiF $CaCl_2$ Al_2O_3 Ba_2Cl_4 Pb_3N_4

What's wrong with the one you circled? _____

8. Draw a 2 dimensional sketch of an ionic crystal lattice of sodium chloride. <u>Make a key</u> to indicate which atoms are sodium and which are chloride.

III. Covalent Bonding: bonds between **non-metals** and **non-metals**. Pages 164-167

10. What is a molecule? _____

_____

11. What is a covalent bond? (Look this one up in the back of the book.) _____

_____

12. A diatomic molecule is _____

_____

13. In figure 6-6,

a. What's attracted to what? _____

_____

b. What's repulsed by what? _____

_____

14. Finally, sketch the hydrogen molecule shown in figure 6-7. Label the region of orbital overlap.