# Chapter 6 Study Guide

## Section 1: Introduction to Chemical Bonding

* What is a chemical bond?
* There are three types of chemical bonds that we discussed. Name all three and what they “result from”.
* Be able to determine if a bond is ionic or covalent by using their electronegativity values.
* Determine the difference between a polar covalent bond and a non-polar covalent bond.
* Be able to use the partial positive, +, and partial negative, -, symbols on the appropriate atoms in a bond.
* Be able to tell which element has a partial negative or partial positive charge when in a bond.

## Section 2: Covalent Bonding and Molecular Compounds

* What is a molecule?
* What type of compounds form molecular compounds?
* What is a chemical formula?
* How do covalent compound’s form?
* **True or False.** Nature favors chemical bonding so that the atoms have lower potential energy when they are bonded to other atoms and become more stable.
* How does the attractive force and repulsive force affect bonding at each step in the P.E. diagram.

 

* What do we call the distance between two atoms at the minimum potential energy?
* What is bond energy?
* Define the octet rule.
* What are the exceptions to the octet rule? Why are there exceptions?
* In your own words, describe how to draw a Lewis dot diagram.
* How do you know when a multiple bond is needed?
* How many electrons are shared in the following types of bonds:
* A single covalent bond ­­­­­­­­­\_\_\_\_\_\_\_\_\_\_
* A double covalent bond \_\_\_\_\_\_\_\_\_\_
* A triple covalent bond \_\_\_\_\_\_\_\_\_\_
* Put the following bonds in order from strongest to weakest:

|  |  |  |
| --- | --- | --- |
| Bond | Avg. bond length (pm) | Avg. bond energy (kJ/mol) |
| H – Cl | 127 | 432 |
| C – N | 147 | 305 |
| C – Br | 194 | 285 |
| N – H | 101 | 386 |
| O – H | 96 | 459 |

* Why are some molecules or ions represented as resonance structures?

## Section 3: Ionic Bonding and Ionic Compounds

* Define Ionic compound.
* Why do we refer to an ionic compounds chemical formula as a formula unit and not a molecule?
* Why do ionic compounds form crystal lattices?
* Define lattice energy?
* Be able to describe the following properties of ionic and covalent bonding:
* Structure
* Strength of bonding
* Formula type
* Melting and boiling point
* Hardness
* Does it dissolve in water?
* Does it conduct electricity?
* What is a polyatomic ion?
* What is different about the Lewis dot structure for a molecule vs. a polyatomic ion?

## Section 4: Metallic Bonding

* How is metallic bonding different from ionic or molecular compounds?
* Define metallic bonding.
* What do we mean by “sea of electrons”?
* What are some of the properties of metals?
* How do we determine metallic strength?

## Section 5: Molecular Geometry

* Know how to predict the geometry of molecules
* Be able to determine bond angles (look at the bottom of your periodic tables)
* What are the three intermolecular forces?
* Which force acts on non-polar molecules?
* Which three elements combined with hydrogen to produces hydrogen bonding?
* What is a dipole?