

## Honors Chemistry – Unit 3 Review

### Chapter 7 – Ionic & Metallic Bonding

- The electrons in the highest occupied energy level of an atom are called the \_\_\_\_\_ electrons.
- The \_\_\_\_\_ rule states that atoms in compounds tend to have the electron configuration of a noble gas.
- Oxygen atoms attain a stable electron configuration by \_\_\_\_\_ two electrons.
- Ionic compounds are composed of \_\_\_\_\_ and \_\_\_\_\_ which are arranged in a repeating 3D crystal structure. This structure makes these compounds \_\_\_\_\_. When \_\_\_\_\_, ionic compounds can conduct electricity.
- Determine the number of valence electrons in each of the following and then draw a Lewis dot structure:
  - Magnesium
  - Chlorine
  - Hydrogen
  - Neon
- Write the electron configuration for the following:
  - Calcium ion
  - Strontium ion
  - Sulfur ion
  - Fluorine ion
- Which of these is not an ionic compound?
  - KF
  - Na<sub>2</sub>SO<sub>4</sub>
  - SiO<sub>2</sub>
  - Na<sub>2</sub>O
- Using Lewis Dot diagrams, show how an ionic bond of sodium oxide is formed.
- Describe how a metallic bond is formed.

### Chapter 8 – Covalent Bonding

- Covalent bonds occur between \_\_\_\_\_ and \_\_\_\_\_ due to the \_\_\_\_\_ of electrons.
- How many electrons are shared in the following bonds?
  - Single covalent bond
  - Double covalent bond
  - Triple covalent bond
- For the following compounds – CF<sub>4</sub>, CO<sub>2</sub>, NH<sub>3</sub>, N<sub>2</sub>, CO, SF<sub>6</sub>, BF<sub>3</sub>, CH<sub>2</sub>Cl<sub>2</sub>, H<sub>2</sub>O – do the following:
  - Draw the Lewis Dot structure
  - Determine the number of lone pair electrons on the central atom
  - Determine the number of atoms bonded to the central atom
  - Indicate the VSEPR geometry for each molecule
  - Determine if the bonds are nonpolar covalent or polar covalent
  - Determine if the molecule is nonpolar or polar
  - Determine the type(s) of intermolecular attractions (dispersion, dipole, hydrogen bonding)
  - Calculate the bond dissociation energy for all bonds in the molecules
- Order the types of bonds from strongest to weakest: London dispersion forces, hydrogen bonds, dipole interactions, ionic bonds, covalent bonds.
- Which of these molecules can form a hydrogen bond with a water molecule?
  - N<sub>2</sub>
  - NH<sub>3</sub>
  - O<sub>2</sub>
  - CH<sub>4</sub>
- Draw all forms of the Lewis structure of the nitrate polyatomic ion.

### Chapter 9 – Chemical Names & Formulas

- |                                   |                           |                                    |
|-----------------------------------|---------------------------|------------------------------------|
| 1. nitrogen trifluoride           | 9. phosphorus triiodide   | 17. H <sub>2</sub> SO <sub>3</sub> |
| 2. barium phosphide               | 10. disulfur decafluoride | 18. CCl <sub>4</sub>               |
| 3. P <sub>4</sub> O <sub>10</sub> | 11. K <sub>2</sub> S      | 19. calcium iodide                 |
| 4. SCl <sub>2</sub>               | 12. NiSO <sub>4</sub>     | 20. hydrobromic acid               |
| 5. Cu(OH) <sub>3</sub>            | 13. aluminum phosphate    | 21. bromic acid                    |
| 6. ammonium carbonate             | 14. magnesium perchlorate | 22. SrCl <sub>2</sub>              |
| 7. carbonic acid                  | 15. iron (III) sulfide    | 23. PbS                            |
| 8. HCl                            | 16. dinitrogen monoxide   | 24. dinitrogen tetroxide           |