

# FPS - Bonding and Naming Chapter 6 - Unit 10 Review

Name \_\_\_\_\_ Period \_\_\_\_\_

## A. Bonding

- Define the following bonding types and give examples of the compounds that are bonded in that way.
  - Ionic Bonding where electrons are exchanged forming ions that attract
    - Examples:  $\text{NaCl}$
  - Covalent Bonding where electron are shared between atoms.
    - Examples:  $\text{H}_2\text{O}$
  - Metallic Bonding where valence-electron are shared between cations
    - Examples:  $\text{Na}$
- What are some identifying properties of ionic bonds? How are the ions arranged? 3-D lattice  
Between opposite charged ions conductor when in solution or melted  
Higher b.p., higher melting point, odorless. Dissolve in polar solvent, Rigid
- What are some identifying properties of covalent bonds? How are the units different from ions?  
Low b.p., low melting point they often have a color, soft  
do not conduct electrical currents. Dissolve in non-polar solvents.
- What are some identifying properties of metallic bonds? How are the electron interactions unique?  
Conduct Heat + Electricity  
↓  
"sea" of delocalized electrons
- Describe the differences in valence electron behavior for each of the 3 bonding types.  

ionic transfers
covalent share between atoms
metallic share between cations.
- What is the octet rule? How do atoms satisfy the octet rule?  
Valence shell has 8  $e^-$   
 $s^2 p^6$   
Gain, lose or share electrons
- How are the bonds in  $\text{H}_2\text{O}$  different from the bonds in  $\text{Li}_2\text{O}$ ?  
Covalent share ve → Ionic transfer electrons

- On the periodic table below, identify the 3 main categories of elements. Then, label the charges for each column.

Periodic Table of the Elements

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B. Lewis Dot Structures and Bonding

9. What is depicted in a Lewis dot structure?

Element symbol and valence electrons

10. Draw the Lewis dot structures for the following elements:

a. Carbon



b. Aluminum



c. Lithium



d. Helium



e. Argon



f. Phosphorus



g. Silicon



h. Oxygen

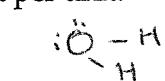


i. Fluorine

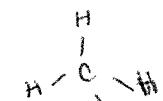


11. Draw the Lewis dot structures for the following compounds. Remember, subscripts tell you the number of atoms present per unit.

a. H<sub>2</sub>O



b. CH<sub>4</sub>



c. LiCl



d. Na<sub>2</sub>S

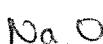


e. O<sub>2</sub>

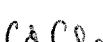


12. Write the chemical formulas for the ionic compounds containing the following elements. Refer to #8 for charges to use the crossing method.

a. Na and O



b. Ca and Cl



c. Mg and N



d. Cs and F



### C. Naming Binary Compounds

13. What are the differences in naming covalent and ionic compounds?

14. When do you NOT use a prefix for a covalent compound? mono on the first element

15. Fill in the prefix table below.

Prefix	Number
Mono	1
di	2
tri	3
tetra	4
penta	5
hexa	6
hepta	7
octa	8
nona	9
deca	10

16. Name the following *ionic* compounds:

- a. NaCl Sodium Chloride
- b. MgF<sub>2</sub> Magnesium Fluoride
- c. AlCl<sub>3</sub> Aluminum Chloride
- d. BeO Beryllium Oxide

17. From the following names, write the chemical formula for the ionic compounds. Write the ions first, then use the crossing method.

- a. Sodium oxide  $\text{Na}_2\text{O}$
- b. Magnesium oxide  $\text{MgO}$
- c. Barium fluoride  $\text{BaF}_2$
- d. Lithium bromide  $\text{LiBr}$

18. Write the names for the following *covalent* compounds.

- a. CO carbon monoxide
- b. CO<sub>2</sub> carbon dioxide
- c. N<sub>2</sub>H<sub>4</sub> dinitrogen tetrahydride
- d. SO<sub>4</sub> Sulfur tetroxide
- e. N<sub>3</sub>O<sub>5</sub> tri nitrogen pentoxide
- f. CS<sub>6</sub> carbon hexa sulfide

19. Write the formula for the following names.

- a. trisilicon tetrafluoride  $\text{Si}_3\text{F}_4$
- b. carbon trioxide  $\text{CO}_3$
- c. dichlorine heptoxide  $\text{Cl}_2\text{O}_7$
- d. tetracarbon decasulfide  $\text{C}_4\text{S}_{10}$
- e. boron hexachloride  $\text{BCl}_6$
- f. dihydrogen dioxide  $\text{H}_2\text{O}_2$

20. Below is a mixed set of chemical compounds. Ionic and covalent are both present. Name or give the chemical formula.

- a. CaO Calcium Oxide
- b. H<sub>2</sub>O<sub>2</sub> Dihydrogen dioxide
- c. Carbon dioxide  $\text{CO}_2$
- d. Magnesium oxide  $\text{MgO}$
- e. PCl<sub>3</sub> phosphorus trichloride
- f. NH<sub>2</sub> nitrogen dihydride
- g. Dinitrogen monoxide  $\text{N}_2\text{O}$
- h. Potassium bromide  $\text{KBr}$
- i. Nitrogen trioxide  $\text{NO}_3$
- j. NO nitrogen monoxide
- k. SF<sub>6</sub> sulfur hexafluoride
- l. Strontium nitride  $\text{Sr}_3\text{N}_2$
- m. Diphosphorus pentoxide  $\text{P}_2\text{O}_5$

