

Name: \_\_\_\_\_

Due: \_\_\_\_\_

### ***Unit 4 Academic Chemistry Study Guide***

#### **Goals & Standards**

- I can write chemical formulas and written names for ionic compounds, covalent compounds, and acids.
- I can compare the properties of ionic compound, covalent compounds, and acids.
- I can compare ionic bonds, covalent bonds, and metallic bonds.
- I can draw accurate lewis dot structures.
- I can determine if a molecule is polar or nonpolar by looking at the symmetry.
- I can determine if a bond is polar or nonpolar by looking at electronegativity differences.
- I can use VSEPR Theory to predict the 3D molecular geometry.

#### **Practice Problems**

1) List if the following compounds are ionic (I), covalent (C), or acidic (A).

- a. NaCl      \_\_\_\_\_
- b. I<sub>2</sub>      \_\_\_\_\_
- c. CCl<sub>4</sub>      \_\_\_\_\_
- d. HBr      \_\_\_\_\_
- e. H<sub>3</sub>PO<sub>4</sub>      \_\_\_\_\_
- f. MgCO<sub>3</sub>      \_\_\_\_\_
- g. (NH<sub>4</sub>)OH      \_\_\_\_\_
- h. O<sub>2</sub>F<sub>6</sub>      \_\_\_\_\_

2) What two conditions determine if a **molecule** is polar or nonpolar? Give examples.

3) What determines if a **bond** is polar or nonpolar? Give examples.

4) Compare single, double, and triple covalent bonds in terms of length and strength.

5) What does VSEPR stand for? What is it used for?

6) Draw the lewis dot structure for water, H<sub>2</sub>O. Why is water's molecular geometry bent and not linear?

### NCFE Multiple Choice Practice

- 7) Which of the following is the correct formula for calcium phosphate?
- $\text{Ca}_3(\text{PO}_4)_2$
  - $\text{CaPO}_4$
  - $\text{Ca}_2(\text{PO}_4)_3$
  - $\text{Ca}_4(\text{PO}_2)_2$
- 8) Which of the following is the correct name for the molecular compound,  $\text{N}_2\text{O}_5$ ?
- nitrogen oxide
  - pentanitrogen dioxide
  - dinitrogen pentoxide
  - nitrogen (II) oxide
- 9) Which of the following is the correct formula for hydrobromic acid?
- $\text{H}_2\text{Br}$
  - $\text{HBrO}_3$
  - $\text{HBr}$
  - $\text{H}_2\text{BrO}_3$
- 10) Which type of molecule is  $\text{CF}_4$ ?
- polar, with a symmetrical distribution of charge
  - polar, with an asymmetrical distribution of charge
  - nonpolar, with a symmetrical distribution of charge
  - nonpolar, with an asymmetrical distribution of charge
- 11) Which molecule contains a triple bond between its atoms?
- $\text{H}_2$
  - $\text{F}_2$
  - $\text{O}_2$
  - $\text{N}_2$
- 12) Which compound contains only covalent bonds?
- $\text{NaOH}$
  - $\text{LiBr}$
  - $\text{CO}_2$
  - $\text{Ca}(\text{NO}_3)_2$
- 13) How are compounds with metallic bonds similar to ionic compounds?
- Both tend to have double and triple bonds.
  - Both tend to have low boiling points.
  - Both tend to have poor conductivity.
  - Both tend to have high melting points.

14) Complete the table.

Compound Type	Summary of Properties
Ionic	
Covalent	
Metallic	
Acid	

15) Complete the table. You will see one like this on your test!

	Lewis Dot Structure	Polar or Nonpolar or Ion?	Molecular Geometry
<b>SO<sub>2</sub></b>			VSEPR Term: _____
<b>SiBr<sub>2</sub>Cl<sub>2</sub></b>			VSEPR Term: _____
<b>CO<sub>3</sub><sup>2-</sup></b>			VSEPR Term: _____
<b>PBr<sub>3</sub></b>			VSEPR Term: _____
<b>CH<sub>4</sub></b>			VSEPR Term: _____