

**CHM 151 Exam 2: Chapters 7, 10, and Nomenclature**

1. Write the correct formula for each molecule, compound or ion.

- a. titanium (IV) sulfite \_\_\_\_\_
- b. nitrite \_\_\_\_\_
- c. oxygen \_\_\_\_\_
- d. magnesium nitride \_\_\_\_\_
- e. hypochlorous acid \_\_\_\_\_
- f. aluminum carbonate \_\_\_\_\_
- g. sodium peroxide \_\_\_\_\_
- h. boron trifluoride \_\_\_\_\_
- i. sulfurous acid \_\_\_\_\_
- j. mercury (II) chloride \_\_\_\_\_

2. Write the correct name for the following compounds or ions:

- a.  $\text{NO}_2(\text{g})$  \_\_\_\_\_
- b.  $\text{CaCO}_3(\text{s})$  \_\_\_\_\_
- c.  $\text{CoBr}_2(\text{s})$  \_\_\_\_\_
- d.  $\text{H}_2\text{PO}_3^- (\text{aq})$  \_\_\_\_\_
- e.  $\text{HI}(\text{g})$  \_\_\_\_\_
- f.  $\text{NH}_4^+$  \_\_\_\_\_
- g.  $\text{H}_3\text{PO}_4(\text{aq})$  \_\_\_\_\_
- h.  $\text{Na}_2\text{O}(\text{s})$  \_\_\_\_\_
- i.  $\text{ZrO}_2(\text{s})$  \_\_\_\_\_
- j.  $\text{H}^-$  \_\_\_\_\_

2. What is the electronic configuration of molybdenum?

3. Write the chemical equation that corresponds to the ionization energy of fluorine.

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

Section: \_\_\_\_\_

4. Give the definition of lattice energy and write the chemical equation that corresponds to the lattice energy of aluminum oxide.

5. For each pair of compounds, circle the one with the higher lattice energy and provide an explanation as to why it has a higher lattice energy.

ScN or MgO

NaI or LiI

6. Indicate the polarity of each polar covalent bond using an arrow and delta notation ( $\delta^-$  or  $\delta^+$ ):

F—H

O—Si

Cl—Cl

H—P

7. Draw the Lewis structure for  $\text{NO}_2^-$

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

Section: \_\_\_\_\_

8. Circle the larger atom or ion in each pair and explain the reasoning behind your choice.

sulfur atom or potassium atom

the hydride ion or the lithium ion

9. Please draw all possible Lewis Dot Structures for  $\text{ICl}_3$  and answer the following questions:

Number of valence electrons: \_\_\_\_\_

Number of electron domains: \_\_\_\_\_

Electron domain geometry: \_\_\_\_\_

Molecular shape: \_\_\_\_\_

Is the molecule polar (Circle one)? Yes No

What is the bond angle? \_\_\_\_\_

What is the hybridization of the central atom: \_\_\_\_\_

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

Section: \_\_\_\_\_

10. Please draw all possible Lewis Dot Structures for  $\text{BF}_3$  and answer the following questions:

Number of electron domains: \_\_\_\_\_

Electron domain geometry: \_\_\_\_\_

Molecular shape: \_\_\_\_\_

Is the molecule polar (Circle one)? Yes No

What is the bond angle? \_\_\_\_\_

What is the hybridization of the central atom: \_\_\_\_\_

11. Identify all types of intermolecular forces and circle the the **strongest type** of intermolecular force in each of the following (London, Dipole-Dipole, Hydrogen Bonding, or Ion-Ion).

$\text{I}_2$  \_\_\_\_\_

$\text{H}_2\text{O}$  \_\_\_\_\_

$\text{H}_2\text{S}$  \_\_\_\_\_

$\text{CH}_4$  \_\_\_\_\_

12. Put the substances in question 11 in order of increasing boiling point? Explain the reason for your ordering.