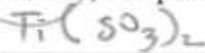


## CHM 151 Exam 2: Chapters 7, 10, and Nomenclature

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

a. titanium (IV) sulfite



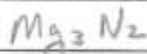
b. nitrite



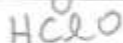
c. oxygen



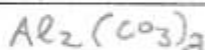
d. magnesium nitride



e. hypochlorous acid



f. aluminum carbonate



g. sodium peroxide



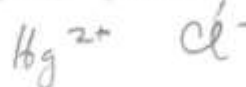
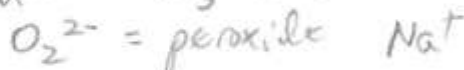
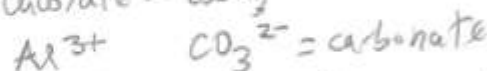
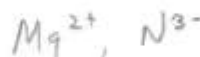
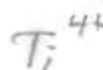
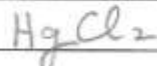
h. boron trifluoride



i. sulfurous acid



j. mercury (II) chloride



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

a.  $\text{NO}_2(\text{g})$ 

nitrogen dioxide

b.  $\text{CaCO}_3(\text{s})$ 

calcium carbonate

c.  $\text{CoBr}_2(\text{s})$ 

cobalt (II) bromide

d.  $\text{H}_2\text{PO}_3^-(\text{aq})$ 

dihydrogen phosphite ion

e.  $\text{HI}(\text{g})$ 

hydrogen iodide

f.  $\text{NH}_4^+$ 

ammonium

g.  $\text{H}_3\text{PO}_4(\text{aq})$ 

phosphoric acid

h.  $\text{Na}_2\text{O}(\text{s})$ 

sodium oxide

i.  $\text{ZrO}_2(\text{s})$ 

zirconium (IV) oxide

j.  $\text{H}^-$ 

hydride

molecular

type I

type II

molecular

acid of phosphate,  $\text{PO}_4^{3-}$ 

simple anion of H

2. What is the electronic configuration of molybdenum? (exception)



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



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

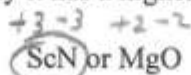
Section: \_\_\_\_\_

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

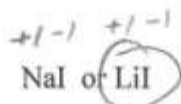
Lattice energy is the energy required to separate an ionic crystal into isolated ions



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.

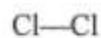
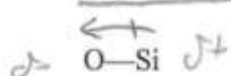
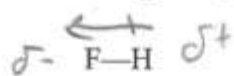


Higher charges lead to higher lattice energy



Smaller ions lead to higher lattice energy

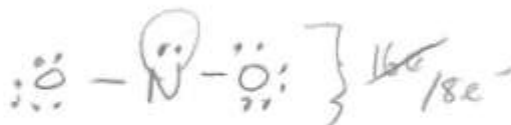
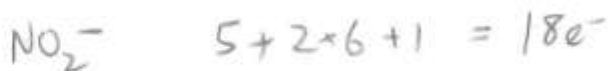
6. Indicate the polarity of each polar covalent bond using an arrow and delta notation ( $\delta^-$  or  $\delta^+$ ):



non polar

non polar

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

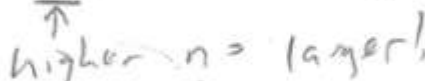


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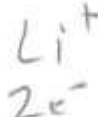
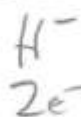
- 3

5

K

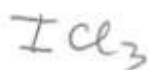


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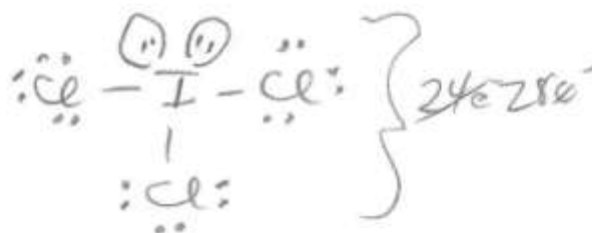


The higher nuclear charge pulls  $\text{Li}^+$  &  $e^-$  closer.

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



$$7 + 3 \times 7 = 28e$$



7

Electron domain geometry: trigonal bipyramidal

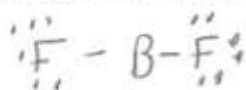
Is the molecule polar (Circle one)? Yes No

What is the bond angle?  $< 90^\circ$   $180^\circ - 3$

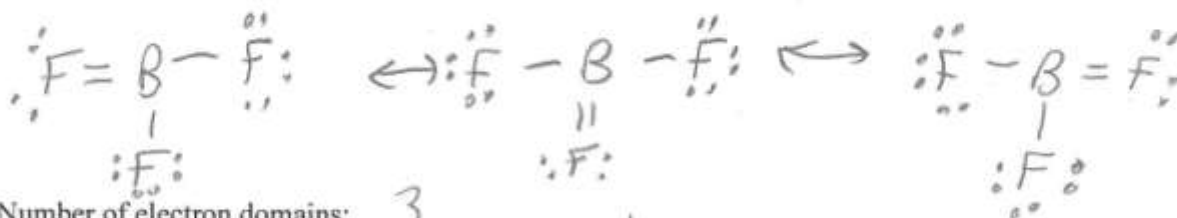
What is the hybridization of the central atom: *sp*

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

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

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

$$3 + 3 \times 7 = 24e^-$$

Number of electron domains: 3Electron domain geometry: trigonal planarMolecular shape: trigonal planarIs the molecule polar (Circle one)? Yes NoWhat is the bond angle? 120°What is the hybridization of the central atom:  $sp^2$ 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). $\text{I}_2$ London $\text{H}_2\text{O}$ London, Dipole-Dipole, H-bond $\text{H}_2\text{S}$ London, Dipole-Dipole $\text{CH}_4$ London

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



for similarly-sized

molecules London forces are weaker than dipole-dipole forces and H-bonds are stronger than dipole-dipole.

 $\text{I}_2$  is much bigger, so more London forces.