

**REVIEW QUESTIONS**

## Chapter 5

1. Binary Ionic – Type I

Assign charges for each ion below, and complete the table with formulas and names for compounds formed by the combination of each cation and anion.

	Ca <u>2+</u>	K <u>1+</u>	Al <u>3+</u>	Zn <u>2+</u>
S <u>2-</u>	<b>CaS</b>	<b>K<sub>2</sub>S</b>	<b>Al<sub>2</sub>S<sub>3</sub></b>	<b>ZnS</b>
	<b>calcium sulfide</b>	<b>potassium sulfide</b>	<b>aluminum sulfide</b>	<b>zinc sulfide</b>
Cl <u>1-</u>	<b>CaCl<sub>2</sub></b>	<b>KCl</b>	<b>AlCl<sub>3</sub></b>	<b>ZnCl<sub>2</sub></b>
	<b>calcium chloride</b>	<b>potassium chloride</b>	<b>aluminum chloride</b>	<b>zinc chloride</b>
N <u>3-</u>	<b>Ca<sub>3</sub>N<sub>2</sub></b>	<b>K<sub>3</sub>N</b>	<b>AlN</b>	<b>Zn<sub>3</sub>N<sub>2</sub></b>
	<b>calcium nitride</b>	<b>potassium nitride</b>	<b>aluminum nitride</b>	<b>zinc nitride</b>
O <u>2-</u>	<b>CaO</b>	<b>K<sub>2</sub>O</b>	<b>Al<sub>2</sub>O<sub>3</sub></b>	<b>ZnO</b>
	<b>calcium oxide</b>	<b>potassium oxide</b>	<b>aluminum oxide</b>	<b>zinc oxide</b>

2. Binary Ionic – Type II

Based on the charges given for each cation, complete the table with formulas and names (Stock and Classical) for compounds formed by the combination of each cation and anion.

	Fe <u>2+</u>	Cu <u>1+</u>	Fe <u>3+</u>	Sn <u>4+</u>
I <u>1-</u>	<b>FeI<sub>2</sub></b>	<b>CuI</b>	<b>FeI<sub>3</sub></b>	<b>SnI<sub>4</sub></b>
	<b>iron (II) iodide</b>	<b>copper (I) iodide</b>	<b>iron (III) iodide</b>	<b>tin (IV) iodide</b>
	<b>ferrous iodide</b>	<b>cuprous iodide</b>	<b>ferric iodide</b>	<b>stannic iodide</b>
P <u>3-</u>	<b>Fe<sub>3</sub>P<sub>2</sub></b>	<b>Cu<sub>3</sub>P</b>	<b>FeP</b>	<b>Sn<sub>3</sub>P<sub>4</sub></b>
	<b>iron (II) phosphide</b>	<b>copper (I) phosphide</b>	<b>iron (III) phosphide</b>	<b>tin (IV) phosphide</b>
	<b>ferrous phosphide</b>	<b>cuprous phosphide</b>	<b>ferric phosphide</b>	<b>stannic phosphide</b>
O <u>2-</u>	<b>FeO</b>	<b>Cu<sub>2</sub>O</b>	<b>Fe<sub>2</sub>O<sub>3</sub></b>	<b>SnO<sub>2</sub></b>
	<b>iron (II) oxide</b>	<b>copper (I) oxide</b>	<b>iron (III) oxide</b>	<b>tin (IV) oxide</b>
	<b>ferrous oxide</b>	<b>cuprous oxide</b>	<b>ferric oxide</b>	<b>stannic oxide</b>

3. Polyatomic

Assign charges for each ion below, and complete the table with formulas and names for compounds formed by the combination of each cation and anion.

	Ba <u>2+</u>	Al <u>3+</u>	NH <sub>4</sub> <u>1+</u>	Pb <u>4+</u>
SO <sub>4</sub> <u>2-</u>	<b>BaSO<sub>4</sub></b>	<b>Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub></b>	<b>(NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub></b>	<b>Pb(SO<sub>4</sub>)<sub>2</sub></b>
	<b>barium sulfate</b>	<b>aluminum sulfate</b>	<b>ammonium sulfate</b>	<b>lead (IV) sulfate</b>
NO <sub>3</sub> <u>1-</u>	<b>Ba(NO<sub>3</sub>)<sub>2</sub></b>	<b>Al(NO<sub>3</sub>)<sub>3</sub></b>	<b>NH<sub>4</sub>NO<sub>3</sub></b>	<b>Pb(NO<sub>3</sub>)<sub>4</sub></b>
	<b>barium nitrate</b>	<b>aluminum nitrate</b>	<b>ammonium nitrate</b>	<b>lead (IV) nitrate</b>
CO <sub>3</sub> <u>2-</u>	<b>BaCO<sub>3</sub></b>	<b>Al<sub>2</sub>(CO<sub>3</sub>)<sub>3</sub></b>	<b>(NH<sub>4</sub>)<sub>2</sub>CO<sub>3</sub></b>	<b>Pb(CO<sub>3</sub>)<sub>2</sub></b>
	<b>barium carbonate</b>	<b>aluminum carbonate</b>	<b>ammonium carbonate</b>	<b>lead (IV) carbonate</b>
PO <sub>4</sub> <u>3-</u>	<b>Ba<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub></b>	<b>AlPO<sub>4</sub></b>	<b>(NH<sub>4</sub>)<sub>3</sub>PO<sub>4</sub></b>	<b>Pb<sub>3</sub>(PO<sub>4</sub>)<sub>4</sub></b>
	<b>barium phosphate</b>	<b>aluminum phosphate</b>	<b>ammonium phosphate</b>	<b>lead (IV) phosphate</b>

4. Covalent

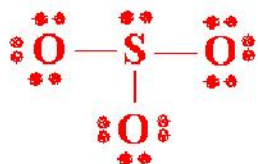
Complete the table below with missing formulas and names.

iodine heptafluoride	<b>IF<sub>7</sub></b>
bromine trifluoride	<b>BrF<sub>3</sub></b>
N <sub>2</sub> O <sub>5</sub>	<b>dinitrogen pentoxide</b>
OF <sub>2</sub>	<b>oxygen difluoride</b>
disulfur hexachloride	<b>S<sub>2</sub>Cl<sub>6</sub></b>
SF <sub>4</sub>	<b>sulfur tetrafluoride</b>



8. Draw Lewis structures and use VSEPR to predict the shape and bond angles and polarity for each of the following molecules or ions:

a)  $\text{SO}_3^{2-}$

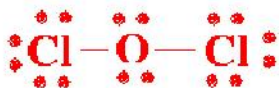


Shape: trigonal pyramidal

Bond angle: 109.5°

Polarity (Y/N): Yes

b)  $\text{OCl}_2$

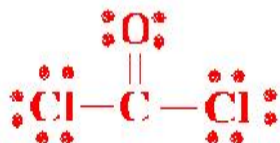


Shape: bent

Bond angle: 109.5°

Polarity (Y/N): Yes

c)  $\text{COCl}_2$

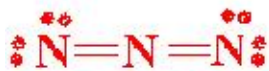


Shape: trigonal planar

Bond angle: 120°

Polarity (Y/N): Yes  
(non-symmetrical)

d)  $\text{N}_3^-$

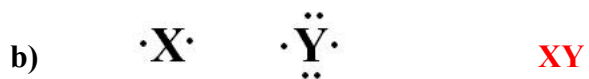
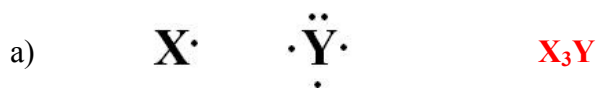


Shape: linear

Bond angle: 180°

Polarity (Y/N): No

9. Write the formula for the ionic compound formed from the combination of the elements indicated by the following electron-dot symbols:



10. Complete each of the following statements with a suitable word or phrase:

- a) Polarity of a bond is caused by difference in electronegativity
- b) Linear molecules with polar bonds are usually non-polar
- c) Molecules with 3 bonding pairs and 1 non-bonding pair of electrons around the central atom have a pyramidal shape.
- d) Bonds that have unequal sharing of electrons are classified as polar covalent
- e) Molecules with 2 bonding pairs and 2 non-bonding pair of electrons around the central atom have a bent shape.