Review – Part 3 Chemistry – Ionic and Covalent Compounds

Name: KEY Date: _____ Block: _____

Use this Review, as well as reading through your notebook and using your practice sheets when studying for your test.

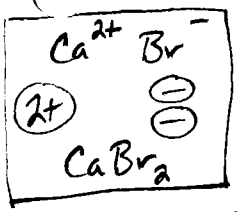
1. **Define: ionic compound.** When a positively charged ion (cation) chemically bonds to a negatively charged ion (anion) These are metal to non-metal bonds.

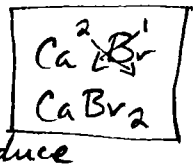
2. Give two examples of ionic compounds: NaCl, MgO, $BaBr_2$, etc.

3. Explain how you ***name*** a simple compound. Use **LiCl** to explain your answer.
   1. Write metal name first as seen on periodic table
   2. Write non-metal name second
   3. Change last few letters (suffix) of non-metal to "ide"

   LiCl ⟹ lithium chloride

4. Explain how you find the ***formula*** for a simple compound. Use **Calcium bromide** to explain your answer.
   1. Write the ions for the metal and non-metal
   2. Balance the charges to be zero OR criss cross & reduce
      OR Drop & swap..... ALWAYS reduce!





5. What is a multivalent ion? Provide two examples. A metal with more than one ion charge. (Mn^{2+}, Mn^{3+}, Mn^{4+}) or (Cu^{2+}, Cu^{1+})

6. Explain how you ***name*** a compound with a *multivalent ion*. Use **$MnCl_3$** to help explain your answer.
   1. a) Reverse cross the subscripts [make sure to look at non-metal to ensure subscripts weren't reduced.]
      b) Determine ion charge on non-metal & figure out what ion charge needs to go on metal that balances the charges.
   2. Whatever the ion charge is on the metal is written as Roman numeral.

$MnCl_3$
$Mn^{3+}Cl^{1-}$
manganese (III) chloride

7. Explain how you find the formula for a compound that has a multivalent ion in it. Use **Chromium (II) oxide** to help explain your answer.
   1. Write metal ion using Roman numeral (as ion charge)
   2. Find ion charge on non-metal from periodic table
   3. Balance charges OR criss cross/reduce

chromium (II) oxide
$Cr^{2+}O^{2-}$
CrO

8. **Define: covalent compound.** A strong attraction between non-metal atoms that forms when atoms share electrons.

9. Give two examples of covalent compounds. CO_2, CO, NO, etc.

10. Explain how you ***name*** a covalent compound? Use **CO_2** to help explain your answer.

1. The subscripts will indicate what "prefix" to use in front of each element name.
2. No "mono" in front of first element name.
3. Change 2nd element's last few letters (suffix) to "ide"

$CO_2 \Longrightarrow$ carbon dioxide

11. Explain how you find the ***formula*** for a compound that is covalent. Use **dinitrogen tetrabromide** to help explain your answer.

The prefix indicates what subscript will be written after each symbol.

*DO NOT REDUCE!

dinitrogen tetrabromide $\Longrightarrow N_2Br_4$

12. Consider the following formula: K_3PO_4. State how many of each atom you have.

a. K: 3

b. P: 1

c. O: 4

d. TOTAL # of ATOMS: 8

13. How many atoms in total are represented by the formula $(H_3O)_2SO_4$?

H: 3x2 = 6
S: 1
O: 2+4 = 6

Total atoms = 13

Note: only multivalent metals will have Roman numerals!

14. Write the names for the following ionic or covalent compound formulas:

a. Al_2O_3 aluminum oxide

b. $FeCl_3$ iron(III) chloride

c. FeO iron(II) oxide

d. PI_3 phosphorus triodide

e. SO_2 sulphur dioxide

f. N_2O_5 dinitrogen pentoxide

g. CuCl copper(I) chloride

h. HgO mercury(II) oxide

i. $PtCl_2$ platinum(II) chloride

j. FeS iron(II) sulphide

15. Write the formulas for the following ionic or covalent compounds:

Name	Ion Charges	Formula
magnesium iodide	$Mg^{2+}\ I^-$	MgI_2
potassium selenide	$K^+\ Se^{2-}$	K_2Se
barium sulphide	$Ba^{2+}\ S^{2-}$	BaS
aluminum fluoride	$Al^{3+}\ F^-$	AlF_3
lead (IV) oxide	$Pb^{4+}\ O^{2-}$	PbO_2
iron (II) chloride	$Fe^{2+}\ Cl^-$	$FeCl_2$
mercury (II) sulphide	$Hg^{2+}\ S^{2-}$	HgS
dihydrogen dioxide	$H^+\ O^{2-}$	H_2O_2
sulfur tetrafluoride	$S^{2-}\ F^-$	SF_4
nitrogen dibromide	$N^{3-}\ Br^-$	NBr_2
triphosphorus hexachloride	$P^{3-}\ Cl^-$	P_3Cl_6

Covalent: → look at name prefix for subscript

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Find the Mistake!

a) Using the ions Mg^{+2} O^{-2}, a student wrote the following formula: $Mg_{-2}O_{+2}$

Mistake	Correction
Student wrote ion charges as subscript and didn't reduce.	MgO

b) Using the ions Pb^{+4} S^{-2}, a student wrote the following formula: Pb_2S_4

Mistake	Correction
Student didn't balance the charges OR reduce.	PbS_2

c) A student named the formula K_3N the following: potassium (III) nitride

Mistake	Correction
Potassium only has 1 ion charge.... doesn't need Roman numerals	potassium nitride

d) A student named the formula Mn_2O_3 the following: manganese oxide

Mistake	Correction
Student forgot to add a Roman numeral to manganese	manganese(III) oxide

e) A student named the formula NO_3 the following: mononitrogen oxide (III)

Mistake	Correction
Oxygen is a non-metal that has only 1 ion charge (doesn't need Roman numerals) and "mono" is not needed in front of nitrogen.	nitrogen trioxide

f) A student stated that the formula for dinitrogen hexasulphide was N_3S

Mistake	Correction
Student used "di" and "hexa" as ion charges then they criss crossed and reduced. → $N^{2+}S^{6-}$ X	N_2S_6