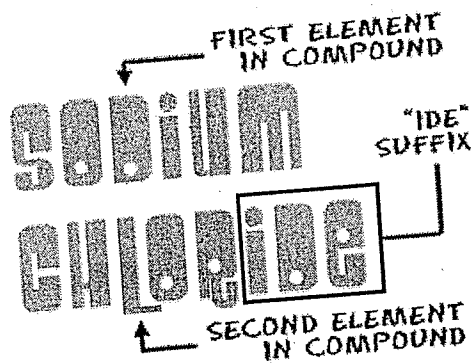


2018-2019  
Key

# Regents Chemistry

## Unit 5: Naming and Formula Writing

### Goal Sheet



NUMBER	PREFIX	EXAMPLE
1	NONE	CHLORIDE
2	DI-	DICHLORIDE
3	TRI-	TRICHLORIDE
4	TETRA-	TETRACHLORIDE
5	PENTA-	PENTACHLORIDE
6	HEXA-	HEXACHLORIDE
7	HEPTA-	HEPTACHLORIDE
8	OCTA-	OCTACHLORIDE
9	NONA-	NONACHLORIDE
10	DECA-	DECACHLORIDE

Major Understandings	Skills you should be able to do	Page(s)
A compound is a substance composed of two or more different elements that are chemically combined in a fixed proportion. A chemical compound can be represented by a specific chemical formula and assigned a name based on a systematic method.	Given a name, write formulas for ionic compounds, molecular compounds, acids and bases. Given a chemical formula for a compound, write the proper name.	253-273
When the metals in Groups 1A, 2A, and 3A lose electrons, they form cations with positive charges equal to their group number.	Identify the charges on metallic cations by using the periodic table	253
The charge of any ion of a Group A nonmetal is determined by subtracting 8 from the group number.	Identify the charges on non-metallic anions by using the periodic table	254
When a cation can have more than one ionic charge, a Roman numeral is used in the name to indicate the charge.	Determine the charge on a transition metal given a chemical formula or a compound name	254-255
The names of most polyatomic ions end in <i>-ite</i> or <i>-ate</i>	Identify polyatomic ions in chemical formulas or compound names (Table E)	257
Metals tend to react with nonmetals to form ionic compounds.	Define ionic compound.	261
The name of a binary ionic compound is the cation name followed by the anion name. To write the formula of an ionic compound, write the symbol for the cation and anion and then balance the charges.	Apply the rules for naming and writing formulas for binary ionic compounds.	261-263

To write formulas for compounds containing polyatomic ions, write the symbol for the metal ion followed by the formula for the polyatomic ion and balance the charges. To name a compound containing a polyatomic ion, state the cation first then the anion.	Apply the rules for naming and writing formulas for compounds with polyatomic ions.	264-266
Nonmetals tend to react with other nonmetals to form molecular (covalent) compounds.	Define covalent (molecular) compound.	268
Prefixes show how many atoms of each element are present in a molecule of a binary compound.	Interpret the prefixes in the names of molecular compounds in terms of their chemical formulas.	268-270
To write the formula for a binary molecular compound, write the symbols for the elements and use the prefixes to determine the subscripts.	Apply the rules for naming and writing formulas for binary molecular compounds.	268-270
An acid is an ionic compound that produces hydrogen ions ( $H^+$ ) ions when dissolved in water.	Identify acids; Apply the rules for naming and writing formulas for acids.	271-272
A base is an ionic compound that produces hydroxide ions ( $OH^-$ ) when dissolved in water.	Identify bases; Apply the rules for naming and writing formulas for bases.	273

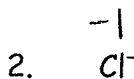
Assigning oxidation numbers

Name \_\_\_\_\_

Determine the oxidation states for each atom present in the given formulas.



$\text{Cl} = \underline{0}$



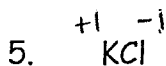
$\text{Cl} = \underline{-1}$



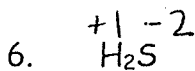
$\text{Na} = \underline{0}$



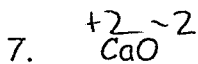
$\text{Na} = \underline{+1}$



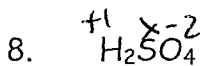
$\text{K} = \underline{+1}$   
 $\text{Cl} = \underline{-1}$



$\text{H} = \underline{+1}$   
 $\text{S} = \underline{-2}$



$\text{Ca} = \underline{+2}$   
 $\text{O} = \underline{-2}$



$\text{H} = \underline{+1}$   
 $\text{S} = \underline{+6}$   
 $\text{O} = \underline{-2}$

$+2 + x - 8 = 0$

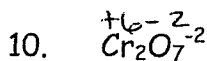
$-6 + x = 0$

$x = +6$



$\text{N} = \underline{+5}$   
 $\text{O} = \underline{-2}$

$[\overset{x}{\text{N}}\overset{-2}{\text{O}_3}]^{-1}$   
 $x - 6 = -1$   
 $x = +5$



$\text{Cr} = \underline{+6}$   
 $\text{O} = \underline{-2}$

$2x - 14 = -2$

$2x = 12$   
 $\frac{2x}{2} = \frac{12}{2}$

$x = +6$

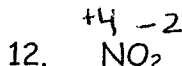


$\text{N} = \underline{-3}$   
 $\text{H} = \underline{+1}$   
 $\text{Cl} = \underline{-1}$

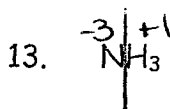
$[\overset{x}{\text{N}}\overset{+1}{\text{H}_4}]^{-1}$

$x + 4 = +1$

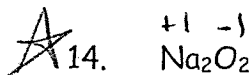
$x = -3$



$\text{N} = \underline{+4}$   
 $\text{O} = \underline{-2}$

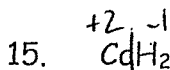


$\text{N} = \underline{-3}$   
 $\text{H} = \underline{+1}$



$\text{Na} = \underline{+1}$   
 $\text{O} = \underline{-1}$

peroxide ion

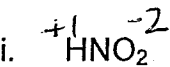
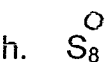
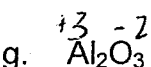
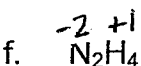
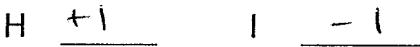
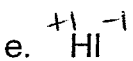
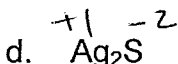
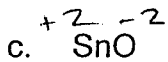
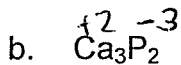
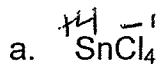


$\text{Ca} = \underline{+2}$   
 $\text{H} = \underline{-1}$

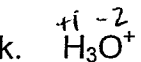
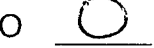
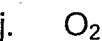
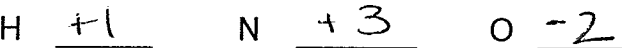
Name: \_\_\_\_\_

Redox Reactions - Practice Problems - Determining Oxidation Numbers

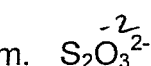
1. Determine the oxidation number of each element in the following compounds.



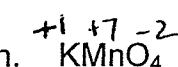
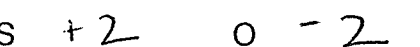
$+1 + x - 4 = 0$



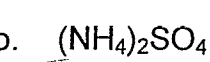
$x - 6 = -1$



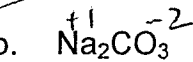
$2x - 6 = -2$



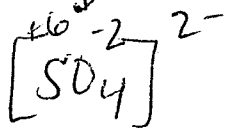
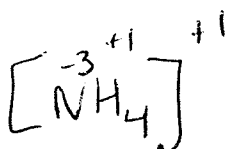
$\frac{2x - 6}{2} = \frac{4}{2}$   
 $x = +7$



separate



$2 + x - 6 = 0$

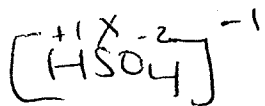


# Assigning Oxidation Numbers

Name \_\_\_\_\_

Assign oxidation numbers to all of the elements in each of the compounds or ions below.

1.	$\begin{matrix} +1 & -1 \\ \text{H} & \text{Cl} \end{matrix}$	11.	$\begin{matrix} +1 & +4 & -2 \\ \text{H}_2 & \text{S} & \text{O}_3 \end{matrix}$ $2 + x - 6 = 0$ $x - 4 = 0$ $x = +4$
2.	$\begin{matrix} +1 & +5 & -2 \\ \text{K} & \text{N} & \text{O}_3 \end{matrix}$ $+1 + x - 6 = 0$ $x - 5 = 0$ $x = +5$	12.	$\begin{matrix} +1 & +6 & -2 \\ \text{H}_2 & \text{S} & \text{O}_4 \end{matrix}$ $2 + x - 8 = 0$ $x - 6 = 0$ $x = +6$
3.	$\begin{matrix} -2 & +1 \\ \text{O} & \text{H} \end{matrix}$	13. <del>*</del>	$\begin{matrix} +2 & -1 \\ * & \text{Mg} & \text{O}_2 \end{matrix}$ peroxide ion
4.	$\begin{matrix} +2 & -3 \\ \text{Mg}_3 & \text{N}_2 \end{matrix}$	14.	$\begin{matrix} +1 & +7 & -2 \\ \text{K} & \text{Mn} & \text{O}_4 \end{matrix}$ $+1 + x - 8 = 0$ $x = +7$
5.	$\begin{matrix} +1 & +5 & -2 \\ \text{K} & \text{Cl} & \text{O}_3 \end{matrix}$ $+1 + x - 6 = 0$ $x = +5$	15. <del>*</del>	$\begin{matrix} +1 & -1 \\ \text{Li} & \text{H} \end{matrix}$ *hydrogen exception
6.	$\begin{matrix} +3 & +5 & -2 \\ \text{Al} & (\text{NO}_3)_3 \end{matrix}$ $x - 6 = -1$ $x = +5$	16.	$\begin{matrix} +4 & -2 \\ \text{Mn} & \text{O}_2 \end{matrix}$ *not peroxide ion (Mn can be +4)
7.	$\begin{matrix} 0 \\ \text{S}_8 \end{matrix}$	17. <del>*</del>	$\begin{matrix} +2 & -1 \\ \text{O} & \text{F}_2 \end{matrix}$ oxygen exception
8.	$\begin{matrix} +1 & -1 \\ \text{H}_2 & \text{O}_2 \end{matrix}$ *peroxide ion	18.	$\begin{matrix} +6 & -2 \\ \text{S} & \text{O}_3 \end{matrix}$
9.	$\begin{matrix} +4 & -2 \\ \text{Pb} & \text{O}_2 \end{matrix}$	19.	$\begin{matrix} -3 & +1 \\ \text{N} & \text{H}_3 \end{matrix}$
10.	$\begin{matrix} +1 & +1 & +6 & -2 \\ \text{Na} & \text{H} & \text{S} & \text{O}_4 \end{matrix}$	20.	$\begin{matrix} 0 \\ \text{Na} \end{matrix}$



$$+1 + x - 8 = -1$$

$$x - 7 = -1$$

$$x = +6$$

7

4

Practice:

1.  $\overset{+2}{\text{Mg}}\overset{+6}{\text{S}}\overset{-2}{\text{O}_4}$  magnesium sulfate (18)  $\text{MgCl}_2$  magnesium chloride
- (2)  $\overset{+3}{\text{Cr}}\overset{+5}{\text{P}}\overset{-2}{\text{O}_4}$  chromium (III) phosphate 19.  $\text{FeCl}_3$  iron (III) chloride
3.  $\overset{+2}{\text{Ba}}(\overset{-2}{\text{O}}\overset{+1}{\text{H}})_2$  barium hydroxide (20)  $\text{NH}_4\text{NO}_3$  ammonium nitrate
- (4)  $\overset{+2}{\text{Pb}}\overset{-2}{\text{S}}$  lead (II) sulfide 21.  $\text{Al}(\text{OH})_3$  aluminum hydroxide
5.  $\overset{+1}{\text{Na}}_2\overset{+4}{\text{C}}\overset{-2}{\text{O}_3}$  sodium carbonate (22)  $\text{PbSO}_3$  lead (II) sulfite
- (6)  $\overset{+2}{\text{Ba}}\overset{-1}{\text{F}_2}$  barium fluoride 23.  $\text{NaClO}_2$  sodium chlorite
7.  $\overset{+2}{\text{Cu}}(\overset{+5}{\text{N}}\overset{-2}{\text{O}_3})_2$  copper (II) nitrate (24)  $\text{CaCrO}_4$  calcium chromate
- (8)  $\overset{+1}{\text{Ag}}\overset{-1}{\text{I}}$  silver iodide 25.  $\text{NiBr}_3$  nickel (III) bromide
9.  $\overset{+2}{\text{Ni}}\overset{+6}{\text{S}}\overset{-2}{\text{O}_4}$  nickel (II) sulfate (26)  $(\text{NH}_4)_3\text{PO}_4$  ammonium phosphate
- (10)  $\overset{+2}{\text{Zn}}_3(\overset{+5}{\text{P}}\overset{-2}{\text{O}_4})_2$  zinc phosphate 27.  $\text{NaHSO}_4$  sodium hydrogen sulfate
11.  $\overset{+1}{\text{Na}}_3\overset{-3}{\text{N}}$  sodium nitride (28)  $(\text{Hg}_2)\text{Cl}_2$  mercury (I) chloride
- (12)  $\overset{+1}{\text{Cu}}_2\overset{+4}{\text{C}}\overset{-2}{\text{O}_3}$  copper (I) carbonate 29.  $\text{Mg}(\text{NO}_2)_2$  magnesium nitrite
13.  $(\overset{-3}{\text{N}}\overset{+1}{\text{H}})_2\overset{+6}{\text{S}}\overset{-2}{\text{O}_4}$  ammonium sulfate (30)  $\text{CuSO}_4$  copper (II) sulfate
- (14)  $\overset{+2}{\text{Ca}}\overset{+4}{\text{C}}\overset{-2}{\text{O}_3}$  calcium carbonate 31.  $\text{Na}[\text{HCO}_3]$  sodium hydrogen carbonate
15.  $\overset{+1}{\text{K}}\overset{-1}{\text{Cl}}$  potassium chloride (32)  $\text{FeO}$  iron (II) oxide
- (16)  $\overset{+2}{\text{Fe}}\overset{+6}{\text{S}}\overset{-2}{\text{O}_4}$  iron (II) sulfate 33.  $\text{Fe}_2\text{O}_3$  iron (III) oxide
17.  $\overset{+1}{\text{Li}}\overset{-1}{\text{Br}}$  lithium bromide (34)  $\text{MgF}_2$  magnesium fluoride

## Naming Ionic Compounds

Write the names for each of the following IONIC compounds. Don't forget Roman Numerals when dealing with a transition metal.

1.  $MgSO_4$  magnesium sulfate
2.  $NH_4Cl$  ammonium chloride
3.  $CrPO_4$  chromium (III) phosphate
4.  $Ba(OH)_2$  barium hydroxide
5.  $PbS$  lead (II) sulfide
6.  $Na_2CO_3$  sodium carbonate
7.  $BaF_2$  barium fluoride
8.  $Cu(NO_3)_2$  copper (II) nitrate
9.  $AgI$  silver iodide
10.  $NiSO_4$  nickel (II) sulfate
11.  $Zn_3(PO_4)_2$  zinc phosphate
12.  $Na_3N$  sodium nitride
13.  $Cu_2CO_3$  copper (I) carbonate
14.  $(NH_4)_2SO_4$  ammonium sulfate
15.  $CaCO_3$  calcium carbonate
16.  $KCl$  potassium chloride
17.  $FeSO_4$  iron (II) sulfate
18.  $LiBr$  lithium bromide
19.  $MgCl_2$  magnesium chloride
20.  $FeCl_3$  iron (III) chloride
21.  $NH_4NO_3$  ammonium nitrate
22.  $Al(OH)_3$  aluminum hydroxide
23.  $CuC_2H_3O_2$  copper (I) acetate
24.  $PbSO_3$  lead (II) sulfite
25.  $NaClO_2$  sodium chlorite
26.  $CaCrO_4$  calcium chromate
27.  $NiBr_3$  nickel (III) bromide
28.  $(NH_4)_3PO_4$  ammonium phosphate
29.  $NaHSO_4$  sodium hydrogen sulfate
30.  $Hg_2Cl_2$  mercury (I) chloride
31.  $Mg(NO_2)_2$  magnesium nitrite
32.  $CuSO_4$  copper (II) sulfate
33.  $NaHCO_3$  sodium hydrogen carbonate
34.  $FeO$  iron (II) oxide
35.  $Fe_2O_3$  iron (III) oxide
36.  $MgF_2$  magnesium fluoride



Name of Compound	Positive Ion	Negative Ion	Formula
Cesium bromide	$\text{Cs}^{+1}$	$\text{Br}^{-1}$	$\text{CsBr}$
Calcium iodide	$\text{Ca}^{2+}$	$\text{I}^{-1}$	$\text{CaI}_2$
Aluminum chloride	$\text{Al}^{3+}$	$\text{Cl}^{-1}$	$\text{AlCl}_3$
Strontium oxide	$\text{Sr}^{2+}$	$\text{O}^{2-}$	$\text{SrO}$
Radium chloride	$\text{Ra}^{2+}$	$\text{Cl}^{-1}$	$\text{RaCl}_2$
Aluminum phosphide	$\text{Al}^{3+}$	$\text{P}^{3-}$	$\text{AlP}$
Tin (II) sulfide	$\text{Sn}^{2+}$	$\text{S}^{2-}$	$\text{SnS}$
Tin (IV) sulfide	$\text{Sn}^{4+}$	$\text{S}^{2-}$	$\text{SnS}_2$
Barium Chloride	$\text{Ba}^{2+}$	$\text{Cl}^{-1}$	$\text{BaCl}_2$
Magnesium sulfide	$\text{Mg}^{2+}$	$\text{S}^{2-}$	$\text{MgS}$
Beryllium nitride	$\text{Be}^{2+}$	$\text{N}^{3-}$	$\text{Be}_3\text{N}_2$
Lead (IV) fluoride	$\text{Pb}^{4+}$	$\text{F}^{-1}$	$\text{PbF}_4$
Sodium oxide	$\text{Na}^{+1}$	$\text{O}^{2-}$	$\text{Na}_2\text{O}$
Magnesium arsenide	$\text{Mg}^{2+}$	$\text{As}^{3-}$	$\text{Mg}_3\text{As}_2$

Write the chemical formulas that correspond to the chemical names below.

1. magnesium sulfate MgSO<sub>4</sub> Mg<sup>2+</sup> SO<sub>4</sub><sup>2-</sup>
2. strontium iodide SrI<sub>2</sub> Sr<sup>2+</sup> I<sup>-</sup>
3. potassium perchlorate KClO<sub>4</sub> K<sup>+</sup> ClO<sub>4</sub><sup>-</sup>
4. sodium sulfide Na<sub>2</sub>S Na<sup>+</sup> S<sup>-2</sup>
5. iron (III) chloride FeCl<sub>3</sub> Fe<sup>+3</sup> Cl<sup>-1</sup>
6. lithium oxide Li<sub>2</sub>O Li<sup>+1</sup> O<sup>2-</sup>
7. silver sulfite Ag<sub>2</sub>SO<sub>3</sub> Ag<sup>+1</sup> SO<sub>3</sub><sup>2-</sup>
8. sodium phosphate Na<sub>3</sub>PO<sub>4</sub> Na<sup>+1</sup> PO<sub>4</sub><sup>3-</sup>
9. ammonium hydroxide NH<sub>4</sub>OH NH<sub>4</sub><sup>+1</sup> OH<sup>-1</sup>
10. tin (IV) carbonate Sn(CO<sub>3</sub>)<sub>2</sub> Sn<sup>+4</sup> CO<sub>3</sub><sup>2-</sup>
11. barium hypochlorite Ba(ClO)<sub>2</sub> Ba<sup>2+</sup> ClO<sup>-1</sup>
12. nickel (II) fluoride NiF<sub>2</sub> Ni<sup>2+</sup> F<sup>-1</sup>
13. strontium nitrate Sr(NO<sub>3</sub>)<sub>2</sub> Sr<sup>2+</sup> NO<sub>3</sub><sup>2-</sup>
14. magnesium hypochlorite Mg(ClO)<sub>2</sub> Mg<sup>2+</sup> ClO<sup>-1</sup>
15. calcium carbonate CaCO<sub>3</sub> Ca<sup>2+</sup> CO<sub>3</sub><sup>2-</sup>

## Naming Practice 2

1. calcium carbonate  $\text{CaCO}_3$   $\text{Ca}^{2+} \text{CO}_3^{2-}$
2. sodium hydride  $\text{NaH}$   $\text{Na}^{+1} \text{H}^{-1}$
3. beryllium phosphate  $\text{Be}_3(\text{PO}_4)_2$   $\text{Be}^{2+} \text{PO}_4^{3-}$
4. iron(III)hydroxide  $\text{Fe}(\text{OH})_3$   $\text{Fe}^{3+} \text{OH}^{-1}$
5. zinc chloride  $\text{ZnCl}_2$   $\text{Zn}^{2+} \text{Cl}^{-1}$
6. magnesium acetate  $\text{Mg}(\text{C}_2\text{H}_3\text{O}_2)_2$   $\text{Mg}^{2+} \text{C}_2\text{H}_3\text{O}_2$
7. silver nitrate  $\text{AgNO}_3$   $\text{Ag}^{+1} \text{NO}_3^{-1}$
8. copper(II)nitrate  $\text{Cu}(\text{NO}_3)_2$   $\text{Cu}^{2+} \text{NO}_3^{-1}$
9. aluminum sulfide  $\text{Al}_2\text{S}_3$   $\text{Al}^{3+} \text{S}^{2-}$
10. ammonium hydroxide  $\text{NH}_4\text{OH}$   $\text{NH}_4^{+1} \text{OH}^{-1}$
11. manganese(IV)oxide  $\text{MnO}_2$   $\text{Mn}^{+4} \text{O}^{2-}$
12. calcium chloride  $\text{CaCl}_2$   $\text{Ca}^{2+} \text{Cl}^{-1}$
13. lead(II)chlorate  $\text{Pb}(\text{ClO}_3)_2$   $\text{Pb}^{2+} \text{ClO}_3^{-1}$
14. mercury(I)oxalate  $\text{Hg}_2\text{C}_2\text{O}_4$   $\text{Hg}_2^{2+} \text{C}_2\text{O}_4^{2-}$
15. potassium phosphide  $\text{K}_3\text{P}$   $\text{K}^{+1} \text{P}^{3-}$
16. barium nitride  $\text{Ba}_3\text{N}_2$   $\text{Ba}^{2+} \text{N}^{3-}$
17. chromium(III)carbonate  $\text{Cr}_2(\text{CO}_3)_3$   $\text{Cr}^{3+} \text{CO}_3^{2-}$
18. gold(I)sulfite  $\text{Au}_2\text{SO}_3$   $\text{Au}^{+1} \text{SO}_3^{2-}$
19. lithium bromide  $\text{LiBr}$   $\text{Li}^{+1} \text{Br}^{-1}$
20. calcium carbide  $\text{Ca}_2\text{C}$   $\text{Ca}^{2+} \text{C}^{4-}$

Now, write the correct formula for each of the compounds listed below

1. potassium iodide KI
2. barium chloride BaCl<sub>2</sub>
3. lithium bromide LiBr
4. sodium hypochlorite NaHClO
5. iron (III) sulfite Fe<sub>2</sub>(SO<sub>3</sub>)<sub>3</sub>
6. chromium (III) sulfide Cr<sub>2</sub>S<sub>3</sub>
7. calcium carbonate CaCO<sub>3</sub>
8. sodium acetate NaC<sub>2</sub>H<sub>3</sub>O<sub>2</sub>
9. cobalt (II) fluoride CoF<sub>2</sub>
10. sodium phosphide Na<sub>3</sub>P
11. tin (IV) oxide SnO<sub>2</sub>
12. gold (III) bromide AuBr<sub>3</sub>
13. copper (II) iodide CuI<sub>2</sub>
14. strontium chloride SrCl<sub>2</sub>
15. lithium acetate LiC<sub>2</sub>H<sub>3</sub>O<sub>2</sub>
16. magnesium hydroxide Mg(OH)<sub>2</sub>
17. nickel (II) nitrate Ni(NO<sub>3</sub>)<sub>2</sub>
18. silver oxide Ag<sub>2</sub>O
19. zinc chloride ZnCl<sub>2</sub>
20. magnesium phosphate Mg<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>
21. chromium (III) sulfite Cr<sub>2</sub>(SO<sub>3</sub>)<sub>3</sub>
22. copper (II) sulfide CuS
23. iron (III) bromide FeBr<sub>3</sub>
24. aluminum nitride AlN
25. calcium sulfate CaSO<sub>4</sub>
26. sodium phosphate Na<sub>3</sub>PO<sub>4</sub>
27. iron (III) nitrate Fe(NO<sub>3</sub>)<sub>3</sub>
28. ammonium carbonate (NH<sub>4</sub>)<sub>2</sub>CO<sub>3</sub>
29. aluminum phosphate AlPO<sub>4</sub>
30. sodium nitrate NaNO<sub>3</sub>
31. potassium nitrate KNO<sub>3</sub>
32. calcium carbonate CaCO<sub>3</sub>
33. ammonium acetate NH<sub>4</sub>C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>
34. aluminum hydroxide Al(OH)<sub>3</sub>
35. magnesium sulfide MgS
36. sodium chloride NaCl
37. barium nitrate Ba(NO<sub>3</sub>)<sub>2</sub>
38. sodium hydroxide NaOH

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

Date: \_\_\_\_\_

### Practice Naming and Formula Writing: Ionic Compounds

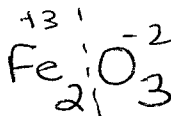
1) Given the formula, write the name:

- $KCl$  potassium chloride
- $Na_2S$  sodium sulfide
- $Ca_3(PO_4)_2$  calcium phosphate
- $MgCrO_4$  magnesium chromate
- $CuBr_2$  copper (II) bromide
- $(NH_4)_2CO_3$  ammonium carbonate
- $Fe(NO_2)_3$  iron (III) nitrite
- $NaC_2H_3O_2$  sodium acetate
- $K_2Cr_2O_7$  potassium dichromate
- $NH_4HCO_3$  ammonium hydrogen carbonate

2) Given the name, write the formula:

- sodium oxalate  $Na_2C_2O_4$
- copper (I) oxide  $Cu_2O$
- calcium nitrate  $Ca(NO_3)_2$
- magnesium hydroxide  $Mg(OH)_2$
- iron (II) sulfite  $FeSO_3$
- potassium carbonate  $K_2CO_3$
- ammonium phosphate  $(NH_4)_3PO_4$
- barium permanganate  $Ba(MnO_4)_2$
- sodium thiocyanate  $NaSCN$
- calcium hypochlorite  $Ca(ClO)_2$

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

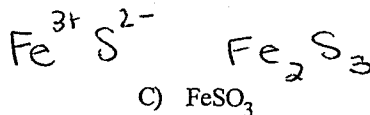


- 1) A compound is made up of iron and oxygen, only. The ratio of iron ions to oxide ions is 2:3 in this compound. The IUPAC name for this compound is

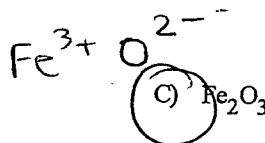
D. A) iron(II) oxide      B) iron trioxide      C) triiron dioxide      D) iron(III) oxide

- 2) What is the chemical formula of iron(III) sulfide?

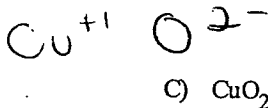
binary

A)  $\text{Fe}_2\text{S}_3$ B)  $\text{Fe}_2(\text{SO}_3)_3$ C)  $\text{FeSO}_3$ D)  $\text{FeS}$ 

- 3) What is the chemical formula for iron(III) oxide?

A)  $\text{Fe}_3\text{O}_2$ B)  $\text{Fe}_3\text{O}$ C)  $\text{Fe}_2\text{O}_3$ D)  $\text{FeO}$ 

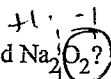
- 4) Which formula represents copper(I) oxide?

A)  $\text{Cu}_2\text{O}$ B)  $\text{Cu}_2\text{O}_2$ C)  $\text{CuO}_2$ D)  $\text{CuO}$ 

- 5) What is the name of the polyatomic ion in the compound  $\text{Na}_2\text{O}_2$ ?

A) oxide

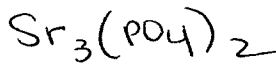
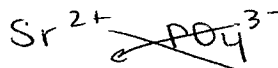
B) oxalate



C) peroxide

D) hydroxide

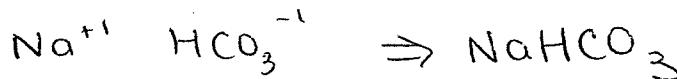
- 6) Which of the following formulas represents strontium phosphate?

A)  $\text{Sr}_2(\text{PO}_4)_3$ B)  $\text{Sr}_3(\text{PO}_4)_2$ C)  $\text{SrPO}_4$ D)  $\text{Sr}_3\text{PO}_8$ 

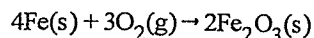
- 7) Which formula represents lead(II) chromate?

A)  $\text{Pb}_2(\text{CrO}_4)_3$ B)  $\text{Pb}_2\text{CrO}_4$ C)  $\text{PbCrO}_4$ D)  $\text{Pb}(\text{CrO}_4)_2$ 

- 8) The chemical name for baking soda is sodium hydrogen carbonate. Write the chemical formula for baking soda.



- 9) Rust on an automobile door contains  $\text{Fe}_2\text{O}_3$ (s). The balanced equation representing one of the reactions between iron in the door of the automobile and oxygen in the atmosphere is given below.



Write the IUPAC name for  $\text{Fe}_2\text{O}_3$ .

iron(III) oxide

12

## Naming Covalent (Molecular) Compounds

# of atoms	1	2	3	4	5	6	7	8
Prefix	mono	di	tri	tetra	penta	hexa	hepta	octa

Roman Numeral

Prefix

1. $\overset{+4}{\text{C}}\overset{-2}{\text{O}}_2$	<u>carbon (IV) oxide</u>	<u>carbon dioxide</u>
2. $\overset{+2}{\text{C}}\overset{-2}{\text{O}}$	<u>carbon (II) oxide</u>	<u>carbon monoxide</u>
3. $\overset{+4}{\text{S}}\overset{-2}{\text{O}}_2$	<u>sulfur (IV) oxide</u>	<u>sulfur dioxide</u>
4. $\overset{+3}{\text{B}}\overset{-1}{\text{F}}_3$	<u>boron (III) fluoride</u>	<u>boron trifluoride</u>
5. $\overset{+1}{\text{N}}_2\overset{-2}{\text{O}}$	<u>nitrogen (I) oxide</u>	<u>dinitrogen monoxide</u>
6. $\overset{+2}{\text{N}}\overset{-2}{\text{O}}$	<u>nitrogen (II) oxide</u>	<u>nitrogen monoxide</u>
7. $\overset{+3}{\text{N}}_2\overset{-2}{\text{O}}_3$	<u>nitrogen (III) oxide</u>	<u>dinitrogen trioxide</u>
8. $\overset{+1}{\text{H}}_2\overset{-2}{\text{S}}$	<u>hydrogen (I) sulfide</u>	<u>dihydrogen monosulfide</u>
9. $\overset{+4}{\text{N}}_2\overset{-2}{\text{O}}_4$	<u>nitrogen (IV) oxide</u>	<u>dinitrogen tetroxide</u>
10. $\overset{+5}{\text{N}}_2\overset{-2}{\text{O}}_5$	<u>nitrogen (V) oxide</u>	<u>dinitrogen pentoxide</u>
11. $\overset{+3}{\text{P}}\overset{-1}{\text{Cl}}_3$	<u>phosphorus (III) chloride</u>	<u>phosphorus trichloride</u>
12. $\overset{+5}{\text{P}}\overset{-1}{\text{Cl}}_5$	<u>phosphorus (V) chloride</u>	<u>phosphorus pentachloride</u>
13. $\overset{-3}{\text{N}}\overset{+1}{\text{H}}_3$	<u>nitrogen (III) hydride</u>	<u>nitrogen trihydride</u>
14. $\overset{+6}{\text{S}}\overset{-1}{\text{Cl}}_6$	<u>sulfur (VI) chloride</u>	<u>sulfur hexachloride</u>

(13)

15.  $P_2O_5$  diphosphorus pentoxide or phosphorus(V) oxide
16.  $CCl_4$  carbon tetrachloride or carbon(IV) chloride
17.  $SiO_2$  silicon dioxide or silicon(IV) oxide
18.  $CS_2$  carbon disulfide carbon(IV) sulfide
19.  $OF_2$  oxygen difluoride oxygen(I) fluoride
20.  $PBr_3$  phosphorus tribromide or phosphorus(III) bromide
21.  $SiF_4$  Silicon tetrafluoride or silicon(IV) fluoride
22.  $IF_5$  iodine pentafluoride or iodine(V) fluoride
23.  $SF_6$  Sulfur hexafluoride or sulfur(VI) fluoride
24.  $SiCl_3$  Silicon trichloride or silicon(III) chloride
25.  $P_4S_3$  tetraphosphorus trisulfide
26.  $H_2O$  dihydrogen monoxide or hydrogen(I) oxide
27.  $SF_4$  sulfur tetrafluoride or sulfur(IV) fluoride
28.  $XeF_4$  Xenon tetrafluoride or xenon(IV) fluoride
29.  $SbF_5$  antimony pentafluoride or antimony(V) fluoride
30.  $CI_4$  carbon tetraiodide or carbon(IV) iodide
31.  $BCl_3$  boron trichloride or boron(III) chloride
32.  $CCl_4$  carbon tetrachloride or carbon(IV) chloride



HW

## Writing Covalent Compound Formulas

1. silicon tetrafluoride  $\text{SiF}_4$
2. iodine pentafluoride  $\text{IF}_5$
3. sulfur hexafluoride  $\text{SF}_6$
4. chlorine dioxide  $\text{ClO}_2$
5. tetraphosphorous trisulfide  $\text{P}_4\text{S}_3$
6. sulfur tetrafluoride  $\text{SF}_4$
7. xenon tetrafluoride  $\text{XeF}_4$
8. dihydrogen monoxide  $\text{H}_2\text{O}$
9. carbon disulfide  $\text{CS}_2$
10. sulfur dioxide  $\text{SO}_2$
11. boron trichloride  $\text{BCl}_3$
12. carbon difluoride  $\text{CF}_2$
13. boron trifluoride  $\text{BF}_3$
14. diarsenic pentoxide  $\text{As}_2\text{O}_5$
15. phosphorus trichloride  $\text{PCl}_3$
16. dinitrogen pentoxide  $\text{N}_2\text{O}_5$
17. nitrogen trihydride  $\text{NH}_3$
18. carbon monoxide  $\text{CO}$
19. silicon dioxide  $\text{SiO}_2$
20. bromine pentachloride  $\text{BrCl}_5$
21. sulfur tetrabromide  $\text{SBr}_4$

## Naming & Writing Chemical Compounds

Compound	Ionic or covalent	Name of Compound
$CO_2$	C	carbon dioxide or carbon(IV) oxide
$NiBr_3$	I	nickel(III) bromide
$Hg_2Cl_2$	I	mercury(I) chloride
$CS_2$	C	carbon disulfide or carbon(IV) sulfide
$SCl_6$	C	sulfur hexachloride or sulfur(VI) chloride
$BaF_2$	I	barium fluoride
$CCl_4$	C	carbon tetrachloride or carbon(IV) chloride
$P_2O_5$	C	diphosphorus pentoxide or phosphorus(V) oxide
$LiI$	I	lithium iodide
$PbS$	I	lead(II) sulfide
$FeO$	I	iron(II) oxide

## Writing Chemical Formulas

Name of Compound	Ionic or covalent	Formula
Carbon disulfide	covalent	$CS_2$
Sulfur dioxide	covalent	$SO_2$
Sodium phosphide	ionic	$Na_3P$
Silver oxide	ionic	$Ag_2O$
Tin (IV) oxide	ionic	$SnO_2$
Boron trichloride	covalent	$BCl_3$
Carbon difluoride	covalent	$CF_2$
Gold (III) bromide	ionic	$AuBr_3$
Strontium chloride	ionic	$SrCl_2$
Copper (II) iodide	ionic	$CuI_2$
Boron trifluoride	covalent	$BF_3$
Diarsenic pentoxide	covalent	$As_2O_5$
Lithium acetate	ionic	$LiC_2H_3O_2$

## Naming & Writing Chemical Compounds

Formula	Ionic or Covalent	Name
$\text{CuI}_2$	ionic	copper (II) iodide
$\text{CCl}_4$	covalent	carbon tetrachloride
$\text{LiC}_2\text{H}_3\text{O}_2$	ionic	lithium acetate
$\text{BaF}_2$	ionic	barium fluoride
$\text{SiO}_2$	ionic	silicon dioxide
$\text{Mg}(\text{OH})_2$	ionic	Magnesium hydroxide
$\text{P}_2\text{O}_5$	covalent	Diphosphorus pentoxide
$\text{Ag}_2\text{O}$	ionic	-Silver oxide
$\text{SCl}_6$	covalent	sulfur hexachloride
$\text{Na}_3\text{P}$	ionic	Sodium phosphide

### Naming Worksheet #3

Name the following compounds:

1.  $\text{Na}_2\text{S}$  sodium sulfide
2.  $\text{CuF}$  copper (I) fluoride
3.  $\text{PbSO}_4$  lead (II) sulfate
4.  $\text{N}_2\text{O}_4$  dinitrogen tetroxide
5.  $\text{Hg}(\text{NO}_3)_2$  mercury (II) nitrate
6.  $\text{Cr}(\text{CN})_3$  chromium (III) cyanide
7.  $\text{NH}_4\text{NO}_3$  ammonium nitrate
8.  $\text{CS}_2$  carbon disulfide
9.  $\text{BeO}$  beryllium oxide
10.  $\text{KMnO}_4$  potassium permanganate
11.  $\text{Ba}_3(\text{PO}_4)_2$  barium phosphate
12.  $\text{Cu}_2\text{O}$  copper (I) oxide
13.  $\text{As}_2\text{O}_3$  diarsenic trioxide
14.  $\text{SF}_6$  sulfur hexafluoride
15.  $\text{MgCO}_3$  magnesium carbonate

Write the correct formula for the following compounds:

- |                           |  |                                    |
|---------------------------|--|------------------------------------|
| 16. magnesium nitride     | <u><math>\text{Mg}_3\text{N}_2</math></u>      | $\text{Mg}^{2+} \text{N}^{3-}$     |
| 17. silicon dioxide       | <u><math>\text{SiO}_2</math></u>               |                                    |
| 18. aluminum oxide        | <u><math>\text{Al}_2\text{O}_3</math></u>      | $\text{Al}^{3+} \text{O}^{2-}$     |
| 19. calcium chlorate      | <u><math>\text{Ca}(\text{ClO}_3)_2</math></u>  | $\text{Ca}^{2+} \text{ClO}_3^{-1}$ |
| 20. lead (II) sulfate     | <u><math>\text{PbSO}_4</math></u>              | $\text{Pb}^{2+} \text{SO}_4^{2-}$  |
| 21. barium chloride       | <u><math>\text{BaCl}_2</math></u>              | $\text{Ba}^{2+} \text{Cl}^{-1}$    |
| 22. silver cyanide        | <u><math>\text{AgCN}</math></u>                | $\text{Ag}^{+1} \text{CN}^{-1}$    |
| 23. nickel (II) phosphate | <u><math>\text{Ni}_3(\text{PO}_4)_2</math></u> | $\text{Ni}^{2+} \text{PO}_4^{3-}$  |
| 24. mercury (II) oxide    | <u><math>\text{HgO}</math></u>                 | $\text{Hg}^{2+} \text{O}^{2-}$     |
| 25. titanium (IV) nitrate | <u><math>\text{Ti}(\text{NO}_3)_4</math></u>   | $\text{Ti}^{4+} \text{NO}_3^{-1}$  |
| 26. copper (II) hydroxide | <u><math>\text{Cu}(\text{OH})_2</math></u>     | $\text{Cu}^{2+} \text{OH}^{-1}$    |
| 27. lithium iodide        | <u><math>\text{LiI}</math></u>                 |                                    |
| 28. cobalt (I) carbonate  | <u><math>\text{Co}_2\text{CO}_3</math></u>     | $\text{Co}^{+1} \text{CO}_3^{2-}$  |
| 29. calcium phosphide     | <u><math>\text{Ca}_3\text{P}_2</math></u>      | $\text{Ca}^{2+} \text{P}^{3-}$     |
| 30. diphosphorus trioxide | <u><math>\text{P}_2\text{O}_3</math></u>       |                                    |

Nomenclature Worksheet - Acids

$\text{HBr(aq)}$  hydrobromic acid

$\text{HCN(aq)}$  cyanic acid

$\text{H}_2\text{CrO}_4\text{(aq)}$  chromic acid

$\text{H}_2\text{S(aq)}$  hydrosulfuric acid

$\text{HI(aq)}$  hydroiodic acid

$\text{HC}_2\text{H}_3\text{O}_2\text{(aq)}$  acetic acid

$\text{H}_2\text{CO}_3\text{(aq)}$  carbonic acid

$\text{H}_3\text{PO}_4\text{(aq)}$  phosphoric acid

$\text{HClO(aq)}$  hypochlorous acid

$\text{HF(aq)}$  hydrofluoric acid

$\text{HNO}_3\text{(aq)}$  nitric acid

$\text{H}_2\text{SO}_4\text{(aq)}$  sulfuric acid

$\text{HClO}_4\text{(aq)}$  perchloric acid

$\text{HCl(aq)}$  hydrochloric acid

$\text{HMnO}_4\text{(aq)}$  permanganic acid

Acetic acid  $\text{HC}_2\text{H}_3\text{O}_2\text{(aq)}$

Sulfurous acid  $\text{H}_2\text{SO}_3\text{(aq)}$

Phosphoric acid  $\text{H}_3\text{PO}_4\text{(aq)}$

Carbonic acid  $\text{H}_2\text{CO}_3\text{(aq)}$

Hydrosulfuric acid  $\text{H}_2\text{S(aq)}$

Perchloric acid  $\text{HClO}_4\text{(aq)}$

Chloric acid  $\text{HClO}_3\text{(aq)}$

Hydrofluoric acid  $\text{HF(aq)}$

Dichromic acid  $\text{H}_2\text{Cr}_2\text{O}_7\text{(aq)}$

Hydrobromic acid  $\text{HBr(aq)}$

Nitric acid  $\text{HNO}_3\text{(aq)}$

Oxalic acid  $\text{H}_2\text{C}_2\text{O}_4\text{(aq)}$

Sulfuric acid  $\text{H}_2\text{SO}_4\text{(aq)}$

Hydroiodic acid  $\text{HI(aq)}$

Hydrochloric acid  $\text{HCl(aq)}$

Nitrous acid  $\text{HNO}_2\text{(aq)}$

Chlorous acid  $\text{HClO}_2\text{(aq)}$

Circled acids are binary

2.1

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

## Hydrate Nomenclature

hydrate – a compound that releases water when heated

Example:  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

Cu	$\text{SO}_4$	•	5	$\text{H}_2\text{O}$
copper(II)	sulfate	part of the compound	penta	hydrate

Example:  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$  magnesium sulfate heptahydrate

Example: aluminum chloride hexahydrate  $\text{AlCl}_3 \cdot 6\text{H}_2\text{O}$

Name the following hydrates:

- $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$  magnesium chloride hexahydrate
- $\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$  cadmium nitrate tetrahydrate
- $\text{ZnCl}_2 \cdot 6\text{H}_2\text{O}$  zinc chloride hexahydrate
- $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$  sodium thiosulfate pentahydrate
- $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$  calcium chloride dihydrate

mono-	one
di-	two
tri-	three
tetra-	four
penta-	five
hexa-	six
hepta-	seven
octa-	eight
nona-	nine
deca-	ten

Write the formulas for the following hydrates:

- barium hydroxide octahydrate  $\text{Ba}(\text{OH})_2 \cdot 8\text{H}_2\text{O}$
- sodium sulfate decahydrate  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$
- lithium chloride tetrahydrate  $\text{LiCl} \cdot 4\text{H}_2\text{O}$
- cobalt(II) chloride hexahydrate  $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$
- sodium carbonate decahydrate  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$