



CHEMICAL NAMES AND FORMULAS

PRACTICE PROBLEMS

In your notebook, solve the following problems.

SECTION 6.1 INTRODUCTION TO CHEMICAL BONDING

1. Give the name and symbol of the ion formed when

a. a chlorine atom gains one electron.

Cl^- chloride

b. a potassium atom loses one electron.

K^+ Potassium

c. an oxygen atom gains two electrons.

O^{2-} oxide

d. a barium atom loses two electrons.

Ba^{2+} Barium

2. How many electrons are lost or gained in forming each ion?

a. Mg^{2+} lost 2

b. Br^- gain 1

c. Ag^+ lost 1

d. Fe^{3+} lost 3

3. Classify each of the following as a cation, anion, or atom.

a. Be atom

c. Cu^{2+} cation

e. O^{2-} anion

g. Cs^+ cation

b. Na^+ cation

d. I^- anion

f. Ca^{2+} cation

h. Ne atom

4. Classify each of the following as a molecular compound or an ionic compound.

a. CO_2 molecular

c. NaCl ionic

e. MgCl_2 ionic

b. N_2 molecular

d. H_2O molecular

5. What types of elements tend to combine to form molecular compounds?

SECTION 6.2 REPRESENTING CHEMICAL COMPOUNDS

1)

Identify the number and kinds of atoms present in a molecule of each compound.

a. citric acid, $\text{C}_6\text{H}_8\text{O}_7$

6 C

8 H

7 O

b. chloroform, CHCl_3

1 C

1 H

3 Cl

c. glycine, $\text{C}_2\text{H}_5\text{NO}_2$

2 C 5 H 1 N 2 O

d. sulfur hexafluoride, SF_6

1 S 6 F

SECTION 6.3 IONIC CHARGES

- What is the charge on the ion typically formed by each element?

a. oxygen 2^-	c. sodium $+1$	e. nickel, 2 electrons lost 2^+
b. iodine 1^-	d. aluminum 3^+	f. magnesium 2^+
- How many electrons does the neutral atom gain or lose when each ion forms?

a. Cr^{3+} $10s^+ 3$	c. Li^+ $10s^+ 1$	e. Cl^- gain 1
b. P^{3-} gain 3	d. Ca^{2+} $10s^+ 2$	f. O^{2-} gain 2
- Name each ion. Identify each as a cation or anion.

a. Sn^{2+} cation Tin(II)	c. Br^- anion Bromide	e. H^- anion hydride
b. Co^{3+} cation Cobalt(III)	d. K^+ cation Potassium	f. Mn^{2+} cation manganese(II)
- Write the formula (including charge) for each ion. Use Table 6.4 if necessary.

a. carbonate ion CO_3^{2-}	c. sulfate ion SO_4^{2-}	e. chromate ion CrO_4^{2-} (
b. nitrate ion NO_3^-	d. hydroxide ion OH^-	f. ammonium ion NH_4^+
- Name the following ions. Identify each as a cation or anion.

a. CN^- Cyanide anion	c. PO_4^{3-} phosphate anion	e. Ca^{2+} calcium cation
b. HCO_3^- Bicarbonate anion	d. Cl^- chloride anion	f. SO_3^{2-} Sulfite anion

SECTION 6.4 IONIC COMPOUNDS

- Write the formulas for these binary ionic compounds.

a. magnesium oxide MgO	c. potassium iodide KI	e. sodium sulfide Na_2S
b. tin(II) fluoride SnF_2	d. aluminum chloride $AlCl_3$	f. ferric bromide $FeBr_3$
- Write the formulas for the compounds formed from these pairs of ions.

a. Ba^{2+}, Cl^- $BaCl_2$	c. Ca^{2+}, S^{2-} CaS	e. Al^{3+}, O^{2-} Al_2O_3
b. Ag^+, I^- AgI	d. K^+, Br^- KBr	f. Fe^{2+}, O^{2-} FeO
- Name the following binary ionic compounds.

a. MnO_2 Manganese IV oxide	b. $CaCl_2$ calcium chloride	c. $NiCl_2$ nickel (II) chloride	d. $CuCl_2$ copper (II) chloride
e. Li_3N Lithium Nitride	f. $SrBr_2$ Strontium Bromide	g. K_2S potassium sulfide	h. $SnCl_4$ Tin(IV) chloride

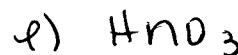
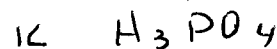
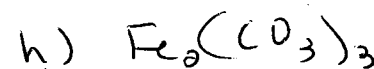
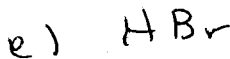
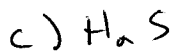
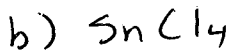
4. Write formulas for the following ternary ionic compounds.
- a. sodium phosphate Na_3PO_4 c. sodium hydroxide NaOH e. ammonium chloride NH_4Cl
 b. magnesium sulfate MgSO_4 d. potassium cyanide KCN f. potassium dichromate $\text{K}_2\text{Cr}_2\text{O}_7$
5. Write formulas for compounds formed from these pairs of ions.
- a. NH_4^+ , SO_4^{2-} $(\text{NH}_4)_2\text{SO}_4$ c. barium ion and hydroxide ion $\text{Ba}(\text{OH})_2$
 b. K^+ , NO_3^- KNO_3 d. lithium ion and carbonate ion Li_2CO_3
6. Name the following compounds.
- a. NaCN Sodium cyanide c. Na_2SO_4 Sodium sulfate e. $\text{Cu}(\text{OH})_2$ Copper (II) hydroxide
 b. FeCl_3 Iron (III) chloride d. K_3CO_3 Potassium carbonate f. LiNO_3 Lithium nitrate

SECTION 6.5 MOLECULAR COMPOUNDS AND ACIDS

1. Name the following molecular compounds.
- a. PCl_5 Phosphorus pentachloride b. NO_2 Nitrogen dioxide c. P_4O_6 Tetraphosphorous hexoxide d. SiO_2 Silicon dioxide
2. Write the formulas for the following binary molecular compounds.
- a. nitrogen tribromide NBr_3 c. sulfur dioxide SO_2
 b. dichlorine monoxide Cl_2O d. dinitrogen tetrafluoride N_2F_4
3. Give the name or formula for these common acids.
- a. HCl Hydrochloric b. H_3PO_4 Phosphoric c. acetic acid $\text{HC}_2\text{H}_3\text{O}_2$ d. sulfuric acid H_2SO_4
4. Name and give the charge of the metal cation in each of the following ionic compounds.
- a. Na_3PO_4 Sodium Na^+ c. CaS Calcium $2+$ e. FeCl_3 Iron (III) $3+$
 b. NiCl_2 Nickel (II) $2+$ d. K_2S Potassium $1+$ f. CuI Copper (I) $1+$
5. For each of the following binary compounds, decide whether the compound is expected to be ionic or molecular.
- a. SeF_4 molecular c. NH_3 molecular e. CO_2 molecular
 b. KBr ionic d. MgBr_2 ionic f. PCl_5 molecular

SECTION 6.6 SUMMARY OF NAMING AND FORMULA WRITING

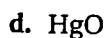
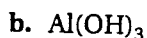
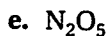
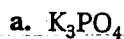
1. Write the formulas for these compounds.
- a. potassium sulfide e. hydrobromic acid i. sulfur hexafluoride
 b. tin(IV) chloride f. aluminum fluoride j. magnesium chloride
 c. dihydrogen sulfide g. dinitrogen pentoxide k. phosphoric acid
 d. calcium oxide h. iron(III) carbonate l. nitric acid



2. Complete this table by writing correct formulas for the compounds formed by combining positive and negative ions.

	SO_4^{2-}	NO_3^-	OH^-	PO_4^{3-}
Ca^{2+}	CaSO_4	$\text{Ca}(\text{NO}_3)_2$	$\text{Ca}(\text{OH})_2$	$\text{Ca}_3(\text{PO}_4)_2$
Al^{3+}	$\text{Al}_2(\text{SO}_4)_3$	$\text{Al}(\text{NO}_3)_3$	$\text{Al}(\text{OH})_3$	AlPO_4
Na^+	Na_2SO_4	NaNO_3	NaOH	Na_3PO_4
Pb^{4+}	$\text{Pb}(\text{SO}_4)_2$	$\text{Pb}(\text{NO}_3)_4$	$\text{Pb}(\text{OH})_4$	$\text{Pb}_3(\text{PO}_4)_4$

3. Name the following compounds.



a) Potassium Phosphate

b) aluminum hydroxide

c) Sodium hydrogen sulfate

d) mercury (II) oxide

e) dinitrogen pentoxide

f) nitrogen tri bromide

g) Phosphorous tri iodide

h) ammonium sulfate