

Chapter 6 – Chemical Names and Formulas

Chapter 6: 1 – 9, 12, 14 – 24, 26 – 28, 31 – 36, 40, 42, 49, 52, 53, 56, 58, 62, 67 (37 total)

Practice Problems

1. Provide the name and symbol of the ion formed when
 - a. a sulfur atom gains two electrons.
 - b. an aluminum atom loses three electrons.
 - c. a calcium ion loses two electrons.
2. How many electrons are lost or gained in forming each ion?
 - a. Ba^{2+}
 - b. As^{3-}
 - c. Cu^{2+}

Section Review 6.1

3. List three characteristics that distinguish ionic compounds from molecular compounds.
 - a.
 - b.
 - c.
4. What is a cation? What is an anion? Relate the two definitions to metals and nonmetals.
5. What does the presence of an *-ide* suffix on the name of an ion tell you about that ion?
6. What are the only elements that exist in nature as isolated atoms? What term is used to describe such elements?
7. What is a molecule? What is the difference between a diatomic molecule and a triatomic molecule? Provide an example of each.

8. Write the symbol and name for the cation formed when

a. a potassium atom loses one electron.

b. a zinc atom loses two electrons.

9. Write the symbol and name for the anion formed when

a. a fluorine atom gains one electron.

b. a sulfur atom gains two electrons.

Section Review 6.2

12. Differentiate between a *chemical formula*, a *molecular formula*, and a *formula unit*.

14. Which law is illustrated by this statement: “In every sample of carbon monoxide, the mass ratio of carbon to oxygen is 3:4”?

15. Which law is illustrated in this statement: “When carbon and oxygen form the compounds carbon monoxide and carbon dioxide, the different masses of carbon that combine with the same mass of oxygen are in the ratio of 2:1”?

Practice Problems

16. What is the charge of the typical ion of each element?

a. selenium

b. barium

c. cesium

d. phosphorus

17. How many electrons does the neutral atom gain or lose when each ion forms?

a. Fe^{3+}

b. O^{2-}

c. Cu^+

d. Cd^{2+}

18. Name each ion in Practice Problem 16. Identify each as an anion or cation.

a.

b.

c.

d.

19. Name each ion in Practice Problem 17.

a.

b.

c.

d.

Section Review 6.3

20. How can the periodic table be used to determine the charge of an ion? Use a specific example to explain.

21. Explain what is meant by a *polyatomic ion*.

22. Using only the periodic table, name and write the formula for the typical ion of each representative element.

a. potassium

b. sulfur

c. argon

d. bromine

e. beryllium

f. sodium

23. Write the formula (including charge) for each ion.

a. ammonium ion

b. tin(II) ion

c. chromate

d. nitrate ion

e. cyanide ion

f. iron(III) ion

g. permanganate ion

h. manganese(II) ion

Practice Problems

24. Write formulas for compounds formed from these pairs of ions.

a. Ba^{2+} , S^{2-}

b. Li^+ , O^{2-}

c. Ca^{2+} , N^{3-}

d. Cu^{2+} , I^-

Practice Problems

26. Write names for these binary ionic compounds.

- a. ZnS
- b. KCl
- c. BaO
- d. CuBr₂

27. Write names for these binary ionic compounds.

- a. CaO
- b. Cu₂Se
- c. FeS
- d. AlF₃

Practice Problems

28. Write formulas for compounds formed from these pairs of ions.

- a. NH₄⁺, SO₃²⁻
- b. calcium ion, phosphate ion
- c. Al³⁺, NO₃⁻
- d. potassium ion, chromate ion

Practice Problems

31. Write names for these compounds.

- a. Al(OH)₃
- b. NaClO₃
- c. Sn₃(PO₄)₂
- d. Na₂CrO₄

Section Review 6.4

32. How are formulas written for binary ionic compounds, given their names? How is the reverse done?

34. Write the name or formula, as appropriate.

a. chromium(III) nitrate

b. $\text{Mg}_3(\text{PO}_4)_2$

c. LiF

d. sodium perchlorate

e. $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2$

f. skip

35. When are parentheses used in writing chemical formulas?

36. What conditions must be met in writing a balanced formula for an ionic compound?

Section Review 6.5

40. Provide the formula or name for these compounds.

a. H_2SO_4

b. H_2CO_3

c. nitric acid

d. phosphoric acid

42. What element typically appears in the formula of a common acid?

Chapter 6 Review

49. Would you expect the following pairs of atoms to combine chemically to give an ionic or molecular compound? 6.2

a. Li and S

b. O and S

c. Al and O

d. F and Cl

e. I and K

f. H and N

52. The melting point of a compound is 1240 °C. Is this compound an ionic or a molecular compound? Explain.

53. Write the symbol for each ion. Be sure to include the charge. 6.3

a. oxide ion

b. lead(II) ion

c. lithium ion

d. nitride ion

e. cupric ion

f. fluoride ion

56. Without consulting Table 6.4, name the following ions. 6.3

a. OH^-

b. Pb^{4+}

c. SO_4^{2-}

d. O^{2-}

e. HPO_4^{2-}

f. $\text{Cr}_2\text{O}_7^{2-}$

g. Al^{3+}

h. ClO_2^-

62. Complete the table below by writing correct formulas for the compounds formed by combining positive and negative ions. Then name each compound. 6.4

	NO_3^-	CO_3^{2-}	CN^-	PO_4^{3-}
NH_4^+				
Sn^{4+}				
Fe^{3+}				
Mg^{2+}				

67. Name these compounds.

a. NaClO_3

b. Hg_2Br_2

c. K_2CrO_4

d. AlI_3

e. SnO_2

f. $\text{Fe}(\text{C}_2\text{H}_3\text{O}_2)_3$

g. KHSO_4

h. CaH_2