# 10.3

# PERCENT COMPOSITION AND CHEMICAL FORMULAS

## **Section Review**

## **Objectives**

- Calculate the percent by mass of an element in a compound
- Interpret an empirical formula
- Compare and contrast empirical and molecular formulas

#### Vocabulary

- percent composition
- · empirical formula

## **Key Equation**

multiple of it.

• % mass of element =  $\frac{\text{mass of element}}{\text{mass of compound}} \times 100\%$ 

## **Part A Completion**

Use this completion exercise to check your knowledge of the terms and your understanding of the concepts introduced in this section. Each blank can be completed with a term, short phrase, or number.

The \_\_\_1\_\_ of a compound is the percent by mass of each

element in a compound. The percent by mass of an element in a	2
compound is the number of grams of the element per g	3
of the compound, multiplied by 100%. To calculate the percent by	4
mass of an element in a known compound, divide the mass of the	5
element in one mole by the <b>3</b> and multiply by 100%.	6
A(n) 4 formula represents the lowest 5 ratio of the	
elements in a compound. It can be calculated from a compound's	
percent composition. The <u>6</u> formula of a compound is either	
the same as its empirical formula, or it is some whole-number	

#### Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

7. It is necessary to know the formula of a compound in order to calculate its percent composition.

**8.** If the percent by mass of carbon in methane, CH<sub>4</sub>, is 75%, then 100 grams of methane contain 25.0 grams of hydrogen.

9. The formula for methane,  $\mathrm{CH}_4$ , is both a molecular and an empirical formula.

**10.** The empirical formula for glucose,  $C_6H_{12}O_6$ , is  $C_2H_4O_2$ .

# **Part C Matching**

Match each description in Column B to the correct term in Column A.

#### Column A

#### Column B

\_\_\_\_11. percent composition

- **a.** describes the actual number of atoms of each element in a molecule of a compound
- \_\_\_\_\_12. empirical formula
- **b.** the lowest whole-number ratio of atoms of the elements in a compound
- \_\_\_\_\_\_13. molecular formula
- c. the percent by mass of each element in a compound

#### **Part D Problems**

Solve the following problems in the space provided. Show your work.

- 14. What is the percent composition of each of the following?
  - **a.**  $Cr_2O_3$

c. HgS

**b.**  $Mn_2P_2O_7$ 

- **d.**  $Ca(NO_3)_2$
- **15.** Determine the empirical formula of the compound with the percent composition of 29.1% Na, 40.5% S, and 30.4% O.
- **16.** How many kilograms of iron can be recovered from 639 kilograms of the ore  $Fe_2O_3$ ?