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Chapter 6 Standardized Test Practice

1. The actual number of atoms of each element contained in a molecule is given by the molecule's:

A. empirical formula. **C.** mass percent formula.

B. molecular formula. **D.** percent composition.

2. What is the molar mass of the sodium sulfate Na_2SO_4?

F. 71.06 g/mol **G.** 94.05 g/mol **H.** 142.05 g/mol **J.** 215.13 g/mol

3. Which of the following in NOT an empirical formula?

A. CH_4 **B.** Na_2SO_4 **C.** H_2O_2 **D.** $Sn_3(PO_4)_2$

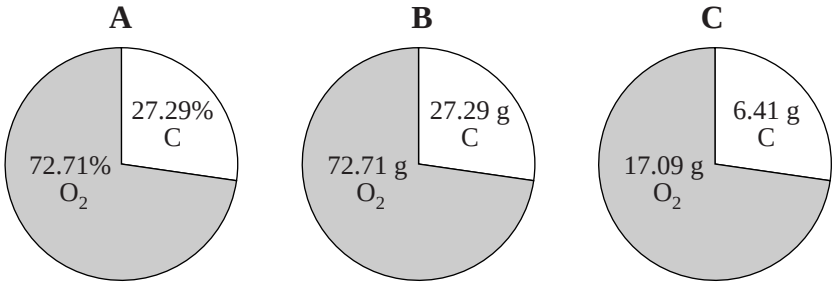
4. What is the percent, by mass, of water in $BaCl_2 \cdot 2H_2O$ (formula mass = 243) equal to?

F. $\frac{18}{243} \times 100$ **G.** $\frac{36}{243} \times 100$ **H.** $\frac{243}{18} \times 100$ **J.** $\frac{243}{36} \times 100$

Passage I

Use the following passage and graphs to answer questions 5–7.

To practice solving percentage composition problems, a student made a series of circle graphs showing the composition of a sample of carbon dioxide (CO_2). Graph A is based on a sample that is 100% CO_2. Graph B represents the mass fractions of a 100.0-g sample of CO_2. Graph C represents the mass fractions of a 23.5-g sample of CO_2.



100% CO_2 100.0 g CO_2 23.5 g CO_2

5. Which graph displays an incorrect composition relationship?

A. Graph A **C.** Graph C

B. Graph B **D.** All of the graphs are correct.

6. Based on the data shown in Graph C, how many atoms of carbon are there in a 23.5-g sample of CO_2?

F. 2.26×10^{23} atoms **H.** 6.02×10^{23} atoms

G. 3.21×10^{23} atoms **J.** 1.18×10^{24} atoms

7. What percentage (on a mass basis) of the sample in Graph C is oxygen (O_2)?

A. 6.41% **B.** 23.49% **C.** 27.29% **D.** 72.71%

8. A sample of 61 g of $AgNO_3$ represents how many moles of $AgNO_3$?

F. 0.044 mol **G.** 0.36 mol **H.** 0.44 mol **J.** 170 mol

9. Molar mass is a whole number multiple of which of the following?

A. Empirical formula mass **C.** Average atomic mass

B. Amu **D.** Mass percent

10. What is the percent composition (by mass) of magnesium iodide (MgI_2)?

F. 91.3% Mg, 8.7% I **H.** 16.1% Mg, 83.9% I

G. 8.7% Mg, 91.3% I **J.** 83.9% Mg, 16.1% I

Passage II

Use the following passage and table to answer questions 11–13.

A student created Table 1 to summarize the results of a mass fraction analysis he performed on an unknown chemical compound. He determined that the compound was composed of carbon, hydrogen, and oxygen.

Table 1

Element	Mass fraction in sample (g)
Carbon	0.0806
Hydrogen	0.01353
Oxygen	0.1074

11. What is the percentage composition of carbon in the unknown compound?

A. 6.71% **B.** 8.06% **C.** 39.99% **D.** 53.29%

12. What is the molecular formula of the unknown compound?

F. CHO **G.** C_2HO **H.** CH_2O **J.** C_2H_2O

13. How many molecules are contained in 1.25 moles of the compound?

A. 1.214×10^{23} molecules **C.** 8.060×10^{23} molecules

B. 7.528×10^{23} molecules **D.** 1.436×10^{24} molecules

14. A compound contains 16% carbon and 84% sulfur by mass. What is the empirical formula of this compound?

F. CS_2 **G.** C_2S_2 **H.** CS **J.** C_2S

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15. A student who likes the taste of salt adds 2.50 moles of sodium chloride (table salt) to her order of French fries. How many grams of salt did she add?

A. 5.00 g **B.** 58.4 g **C.** 146 g **D.** 6.02×10^{23} g

16. Which of the following compounds has the empirical formula CH?

F. CH_4 **G.** C_2H_4 **H.** C_6H_6 **J.** C_3H_8

17. What is the total number of SO_2 molecules in a 0.10-mole sample of SO_2?

A. 6.0×10^{21} **B.** 6.0×10^{22} **C.** 6.0×10^{23} **D.** 6.0×10^{24}