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Chapter 7 Standardized Test Practice

1. Which of the following statements is true?

A. An equation is balanced by changing the subscripts as needed.

B. Matter is usually, but not always, conserved in a balanced chemical equation.

C. Reactants are substances written to the left of the reaction arrow.

D. Coefficients indicating the relative number of molecules of each substance in a reaction cannot be changed in order to balance the reaction equation.

2. Bromine is a diatomic molecule that exists in the liquid state at normal conditions. What is the formula for bromine?

F. Br **G.** Br_2 (*l*) **H.** Br (*l*) **J.** 2Br (*l*)

3. In the reaction $4Zn + 10HNO_3 \longrightarrow 4Zn(NO_3)_2 + NH_4NO_3 + 3H_2O$, how many nitrate ions are present?

A. 3 **B.** 4 **C.** 13 **D.** 19

4. Which set of coefficients balances the following equation?

$AlCl_3 + NaOH \longrightarrow Al(OH)_3 + NaCl$

F. 1, 3, 1, 3 **G.** 3, 1, 3, 1 **H.** 1, 1, 1, 3 **J.** 3, 1, 1, 1

Passage I

Use the following passage to answer questions 5–6.

A student proposed the following equation for a reaction she observed during a laboratory experiment. In the reaction a thin strip of magnesium metal is burned in air. The product of the reaction is a white powder called magnesium oxide.

$Mg(s) + O_2(g) \longrightarrow MgO(s)$

5. Which of the following statements is false?

A. Oxygen is a diatomic molecule.

B. The reactant magnesium is a solid before the reaction occurs.

C. The product, magnesium oxide, is an ionic compound composed of Mg^{2+} and O^{2-} ions.

D. none of the above

6. Based on examining the student's reaction equation, which of the following statements is true?

F. The reaction equation is balanced correctly.

G. The reaction equation is not balanced correctly.
The balanced equation is $Mg(s) + O(g) \longrightarrow MgO(s)$

H. The reaction equation is not balanced correctly.
The balanced equation is $2Mg(s) + O_2(g) \longrightarrow 2MgO(s)$

J. The reaction equation is not balanced correctly.
The balanced equation is $Mg(s) + O_2(g) \longrightarrow 2MgO(s)$

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7. Which of the following is the best description of NaCl(*aq*)?

A. Sodium chloride molecules dissolved in water

B. Sodium chloride crystallized from water solution

C. Sodium atoms and chloride atoms dissolved in water

D. Sodium ions and chloride ions in a water solution

8. Given the unbalanced equation, $Ca(OH)_2 + (NH_4)_2SO_4 \rightarrow CaSO_4 + NH_3 + H_2O$, what is the sum of the coefficients when the equation is completely balanced, using the smallest whole-number coefficients?

F. 5 **G.** 7 **H.** 9 **J.** 11

9. In the chemical equation $C_2H_5OH(l) + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(g)$, the term to the right of the reaction arrow represents:

A. 2 grams of carbon dioxide.

B. 2 atoms of carbon for each molecule of O_2 in the carbon dioxide molecule.

C. 2 molecules of carbon dioxide.

D. 2 liters of carbon dioxide.

10. Which set of coefficients balances the following equation?
$C_3H_8 + O_2 \rightarrow CO_2 + H_2O$

F. 3, 10, 9, 12 **G.** 1, 3, 5, 4 **H.** 1, 5, 3, 4 **J.** 2, 10, 5, 4

Passage II

Use the following passage and tables to answer questions 11–15.

A student created Table 1 to summarize the results of three experiments conducted to explore the nature of chemical reactions. The student then summarized the indicators of chemical reactions in Table 2.

Table 1

Description of experiment	Description of result
I. Passed an electric current through water	Bubbles formed in water and floated to surface.
II. Added a solution of amber-colored sodium dichromate to a colorless solution of lead nitrate	A bright yellow solid substance formed in the beaker.
III. Burned methane gas using a Bunsen burner	A very hot blue flame is produced.

Table 2

Possible Indicators of Chemical Reactions
Color change
Formation of a solid
Formation of bubbles
Production of a flame, or heat being absorbed or given off

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11. Which of the three experiments shows signs of a chemical change (reaction) taking place?

A. Experiment I only
C. Experiment III only
B. Experiments I and II
D. Experiments I, II, and III

12. What are the reactants in Experiment III?

F. Methane only
H. Methane and oxygen
G. Air only
J. Carbon dioxide, heat, and light

13. Which of the following clues that a chemical reaction has occurred was observed in Experiment II?

A. Color change
C. Formation of bubbles
B. Formation of a solid
D. Absorption of heat

14. What is the reactant in Experiment I?

F. Oxygen **G.** Hydrogen **H.** Water **J.** Air

15. Experiment I involves a process known as electrolysis—the process of using an electrical current to break water (H_2O) down into its component gases. What are the products of electrolysis?

A. Oxygen gas only
B. Carbon dioxide gas only
C. Oxygen, hydrogen, and carbon dioxide gases
D. Oxygen and hydrogen gases

16. In the presence of an open flame, hydrogen gas can combine explosively with oxygen in air to form water. Which chemical equation correctly describes this reaction?

F. $2H(g) + O(g) \rightarrow H_2O(l)$
H. $H(g) + O_2(g) \rightarrow H_2O(l)$
G. $H_2(g) + O(g) \rightarrow H_2O(l)$
J. $2H_2(g) + O_2(g) \rightarrow 2\ H_2O(l)$

17. When the equation $Al + O_2 \rightarrow Al_2O_3$ is balanced using smallest whole-number coefficients, what is the coefficient for Al_2O_3?

A. 1 **B.** 2 **C.** 3 **D.** 4

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