Chemical Reactions

Multiple Choice

Write the letter of the correct answer on the line at the left.

____ 1. A change in matter that produces new substances is called a
   a. chemical reaction.  b. physical change.
   c. mixture.  d. solution.

____ 2. Which of the following cannot be used to put out a small fire?
   a. water  b. carbon dioxide
   c. baking soda  d. oxygen

____ 3. Which of the following is an example of a physical property?
   a. chemical composition  b. ability to burn
   c. freezing point  d. ability to react with metals

____ 4. A chemical reaction in which energy is absorbed in the form of heat is called
   a. synthetic.  b. exothermic.
   c. combustion.  d. endothermic.

____ 5. Chemical equations must be balanced because they describe how chemical
   reactions obey the principle of
   a. activation.  b. conservation of matter.
   c. decomposition.  d. mass coefficients.

____ 6. Most inhibitors work by preventing
   a. reactants from coming together.
   b. enzymes from working.
   c. products from forming.
   d. combustion.

____ 7. When two or more substances combine to form a more complex substance,
   the process is called a
   a. decomposition reaction.
   b. replacement reaction.
   c. synthesis reaction.
   d. physical change.

____ 8. The number in front of a chemical formula that tells how many molecules or
   atoms of each reactant take part in a reaction is called a
   a. symbol.  b. subscript.
   c. coefficient.  d. concentration.
9. Which of the following is an example of a chemical change?
   a. meat spoiling  
   b. water freezing  
   c. mercury rising  
   d. butter softening

10. Which statement is true about an exothermic reaction?
   a. It releases energy.  
   b. It absorbs energy.  
   c. It requires no activation energy.  
   d. The energy of the products is greater than the energy of the reactants.

Completion

Fill in the blank to complete each statement.

11. The energy required to start a chemical reaction is called ________________.

12. A(n) ____________________ is a material that slows down the rate of a chemical reaction.

13. Reactions that release energy are called ____________________.

14. A(n) ____________________ is a biological catalyst that can be found in the cells of your body.

15. In the fire triangle, coal is an example of a(n) ________________.

True or False

If the statement is true, write true. If it is false, change the underlined word or words to make the statement true.

16. A chemical equation shows a chemical reaction using symbols instead of words.

17. Combustion is the rapid reaction between carbon dioxide and fuel.

18. In a(n) open system, matter is not allowed to enter or leave.

19. A precipitate is a solid formed from solution during a chemical reaction.

20. The reactants are the new materials produced during a chemical reaction.
Using Science Skills

Use the diagram below to answer questions 21 through 23. Write your answers on the diagram and in the spaces provided.

21. Interpreting Diagrams Label the reactants and products on lines a and b in the figure above.

22. Drawing Conclusions Is this reaction endothermic or exothermic? Explain your answer.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

23. Would increasing the concentration of the reactants change the value of the activation energy on the graph? Explain.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Essay

Write an answer for each of the following questions on a separate sheet of paper.

24. How is water able to stop the combustion of fuels?

25. Use the principle of conservation of matter to explain how you know the following equation is balanced. The symbol Fe represents iron and O represents oxygen. How many atoms of iron and oxygen are present as products and how many are present as reactants?

\[ 4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3 \]
Using Science Skills: Interpreting Diagrams

Use the table below to answer questions 26 and 27. Write your answers on a separate sheet of paper.

<table>
<thead>
<tr>
<th>Compound name</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>hydrochloric acid</td>
<td>HCl</td>
</tr>
<tr>
<td>hydrogen iodide</td>
<td>HI</td>
</tr>
<tr>
<td>lithium chloride</td>
<td>LiCl</td>
</tr>
</tbody>
</table>

26. Applying Concepts  Write and balance the following chemical reactions.
   a. Hydrogen (H₂) reacts with iodine (I₂) to form hydrogen iodide.
   b. Lithium (Li) and hydrochloric acid react to produce hydrogen (H₂) and lithium chloride.
   c. When you run an electric current through water, you get hydrogen (H₂) and oxygen (O₂).

27. Classifying  Identify each chemical reaction described above as a synthesis, decomposition, or replacement reaction. Explain your choices.

Essay

Answer questions 28–30 on a separate sheet of paper.

28. When baking soda and vinegar are combined, gas bubbles form, the vinegar smell disappears, and the mixture gets colder. Has a chemical or physical change taken place? How do you know?

29. Describe the function of enzymes in the body. Why are enzymes necessary in living things?

30. When balancing a chemical equation, why can you change the coefficients but not the subscripts?