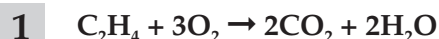


## Chapter 5 Reactions

## Standards Practice



This chemical equation shows how ethene ( $\text{C}_2\text{H}_4$ ) combines with oxygen ( $\text{O}_2$ ) to form carbon dioxide ( $\text{CO}_2$ ) and water ( $\text{H}_2\text{O}$ ). The equation represents a chemical change because the

- A number of atoms in the reactants differs from the number of atoms in the products.
- B product molecules have atoms different from those in the reactants.
- C reactant atoms rearranged to form different combinations in the products.
- D reactant molecules have the same properties as the products.

**2** In which chemical equation below are *both* oxygen ( $\text{O}_2$ ) and hydrogen ( $\text{H}_2$ ) reactants?

- A  $2\text{H}_2\text{SO}_4 \rightarrow 2\text{H}_2\text{O} + \text{O}_2 + 2\text{SO}_2$
- B  $4\text{H}_2 + \text{Fe}_3\text{O}_4 \rightarrow 3\text{Fe} + 4\text{H}_2\text{O}$
- C  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
- D  $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$

**3** A student has measured the mass of a sample of baking soda and a sample of vinegar before mixing them together. After mixing the two samples together, the student should find that the mass of the products is

- A equal to the mass of the baking soda.
- B less than the mass of the vinegar.
- C greater than the combined mass of the baking soda and vinegar.
- D equal to the combined mass of the baking soda and vinegar.

**4** According to the principle of the conservation of matter, in any chemical reaction

- A reactants lose atoms to form products.
- B the total number of atoms stays the same.
- C reactants gain atoms to form products.
- D atoms are not involved.



This chemical equation represents the chemical reaction between potassium and water. Which coefficient for water ( $\text{H}_2\text{O}$ ) will correctly balance the equation?

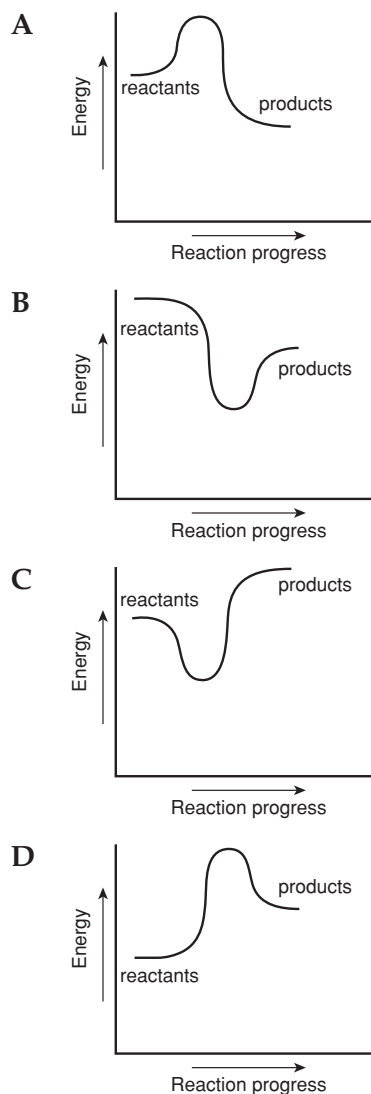
- A 1
- B 2
- C 3
- D 4

## Chapter 5 Reactions

6 Which chemical equation below is a balanced equation for the burning of butane ( $\text{C}_4\text{H}_{10}$ )?

- A  $2\text{C}_4\text{H}_{10} + 2\text{O}_2 \rightarrow 2\text{CO}_2 + 4\text{H}_2\text{O}$   
B  $\text{C}_4\text{H}_{10} + 4\text{O}_2 \rightarrow 4\text{CO}_2 + 4\text{H}_2\text{O}$   
C  $\text{C}_4\text{H}_{10} + 6\text{O}_2 \rightarrow 4\text{CO}_2 + 4\text{H}_2\text{O}$   
D  $\text{C}_4\text{H}_{10} + 12\text{O}_2 \rightarrow 4\text{CO}_2 + 4\text{H}_2\text{O}$

7 The graphs below show the energy changes that occur during a chemical reaction. Which graph *best* describes a chemical reaction that absorbs energy?

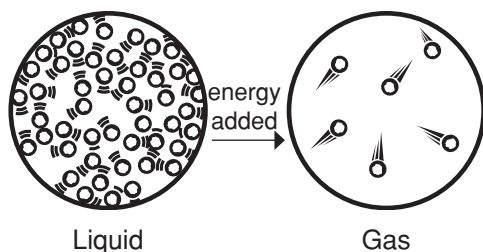


8 Several campers sitting around a campfire discuss the chemical reaction that occurs when wood burns. They know that this reaction

- A is an endothermic reaction.  
B is an exothermic reaction.  
C does not require activation energy.  
D absorbs energy overall.

9 A student mixes together water and salt in a beaker until the salt completely dissolves, then sets the beaker aside. After several days, the student returns to find only a white solid in the beaker. Which of the following scenarios *best* describes what happened?

- A The water evaporated from the solution, leaving the salt behind.  
B A chemical reaction between the water and salt formed a white powder.  
C The molecules of water were absorbed by the salt.  
D The atoms of the water and salt combined to form a new substance.

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**The change in state from a liquid to a gas requires energy because**

- A all chemical reactions need activation energy to start.
- B energy breaks the chemical bonds holding together the particles of matter.
- C endothermic reactions require heat to continue.
- D energy causes the particles of a liquid to move faster and faster until the substance becomes a gas.

**11**

**The melting point of a substance is the temperature at which**

- A the chemical bonds of the substance break apart.
- B the substance changes from a solid to a liquid.
- C the substance freezes.
- D the substance changes from a liquid to a gas.

**12**

**A student mixes together iron filings and sand, then removes the iron filings from the mixture with a magnet. Making a mixture is a physical change because**

- A the original parts of the mixture can be separated without being changed.
- B the atoms of the reactants combine to form a new substance.
- C the chemical properties of the substances can be used to separate them.
- D new chemical bonds are formed.

**13**

Item	pH value
hydrochloric acid	0
vinegar	2.8
milk	6.4
soap	10

**The table lists the pH values of some common items. Which has the *highest* concentration of hydrogen ions ( $H^+$ )?**

- A hydrochloric acid
- B soap
- C vinegar
- D milk

**14**

**A student is using a pH meter to find the pH of an unknown substance. If this substance is neutral, its pH will most likely be**

- A 1.
- B 5.
- C 7.
- D 9.

