Name _____ Class _____ Date _____

Section 7.5 Equilibrium

(pages 216–219)

This section explains physical and chemical equilibria, and describes the factors that affect chemical equilibrium.

Reading Strategy (page 216)

Outlining As you read, make an outline of the most important ideas from this section. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

I. Equilibrium
  A. Types of Equilibria
    1.
    2.
  B.
    1. Temperature
    2. Pressure
    3.

Types of Equilibria (pages 216–217)

1. What is equilibrium? _____

_____

_____

2. Circle the letter of the correct answer. In the system described by the equation $H_2O(l) \rightleftharpoons H_2O(g)$, at room temperature, which of the following two physical changes are in equilibrium?

a. sublimation and condensation

b. evaporation and melting

c. sublimation and deposition

d. evaporation and condensation

3. What happens when a physical change does not go to completion?

_____

_____

4. What does the single arrow imply about the reaction described in the following equation?

$$CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(g)$$

_____

_____

5. Circle the letter of the correct answer. In the system described by the equation $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$, what two reaction types are in equilibrium?

a. synthesis and decomposition
b. single replacement and decomposition
c. synthesis and combustion
d. synthesis and double replacement

6. What happens when a chemical change does not go to completion?

_____

_____

Factors Affecting Chemical Equilibrium (pages 218–219)

7. Is the following sentence true or false? A change in reaction conditions does not affect a chemical equilibrium. _____

8. Circle the letter of each correct answer. The synthesis of ammonia is described by the equation $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) + \text{heat}$. Which reaction is favored when the temperature is lowered?

a. the forward reaction
b. the reverse reaction
c. the reaction that removes heat from the system
d. the reaction that adds heat to the system

9. Circle the letter of each correct answer. During the synthesis of ammonia, which reaction is favored when hydrogen is added to the system?

a. the forward reaction
b. the reverse reaction
c. the reaction that removes hydrogen from the system
d. the reaction that adds hydrogen to the system

10. According to Le Châtelier's principle, how does lowering the concentration of a reaction product affect a chemical equilibrium? _____

_____

11. Use the equation $C(s) + H_2O(g) + \text{heat} \rightleftharpoons CO(g) + H_2(g)$ to complete the table below.

An Example of Le Châtelier's Principle		
An increase in	**Shifts the equilibrium so as to**	**Favoring the**
	Remove heat	Forward reaction
Pressure	Produce fewer gas molecules	
Concentration of H_2		Reverse reaction