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Unit 10G Practice Problems III
Chemical Equilibrium

Name:

Date:

Multiple Choice – Circle the best answer.

1. The study of reaction rates is called:

   a. chemical kinetics
   b. chemical equilibrium
   c. collision chemistry
   d. catalytic chemistry

2. Which of these will not increase the rate of a reaction?

   a. grinding a solid reactant into a powder
   b. adding more soluble reactant in a solution
   c. increasing the pressure on reactants in solution
   d. increasing the temperature of the reactants

3. A catalyst:

   a. speeds up a reaction
   b. is permanently altered by the reaction
   c. raises the energy required to produce an effective collision
   d. all of these

4. Only _____ reactions can reach a state of equilibrium.

   a. precipitation
   b. combustion
   c. decomposition
   d. reversible

5. What is equal at equilibrium?

   a. the concentrations of reactants and products
   b. the rates of the forward and reverse reaction
   c. both a and b

6. Choose the correct K_{eq} expression for this reaction: $A + 2B \leftrightarrows AB_2$

   a. $K_{eq} = \frac{[AB_2]}{[A][2B]}$
   b. $K_{eq} = \frac{[A][B]^2}{[AB_2]}$
   c. $K_{eq} = \frac{[AB_2]}{[A]+[B]^2}$
   d. $K_{eq} = \frac{[AB_2]}{[A][B]^2}$

7. In K_{eq} expressions, "[ ]" represents _____ of reactants and products.

   a. concentration
   b. moles
   c. mass
   d. temperature

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8. If the value of K_{eq} is greater than 1, at equilibrium the _____ reaction is favored and the concentration of _____ will be greater.

   a. forward; reactants
   c. reverse; reactants
   b. forward; products
   d. reverse; products

9. The principle which enables us to predict shifts in an equilibrium system is:

   a. LeChatelier's Principle
   c. the collision theory
   b. the kinetic-molecular theory
   d. a reaction mechanism

10. According to the principle in the question above, when a stress is applied to a system in a state of equilibrium, the system will always react in a way that:

   a. increases the stress
   b. increases the concentration of products
   c. counteracts the stress
   d. favors the reverse reaction

The following reaction is in a state of equilibrium. Predict the direction of the shift when stresses are applied:

$$4\ NH_3\ (g) + 5\ O_2\ (g) \leftrightarrows 4\ NO\ (g) + 6\ H_2O\ (g) + \text{heat}$$

11. Only _____ reactions can reach a state of equilibrium.

   a. shift to the right
   b. shift to the left
   c. neither

12. NH_3 is added.

   a. shift to the right
   b. shift to the left
   c. neither

13. The temperature is increased.

   a. shift to the right
   b. shift to the left
   c. neither

14. A catalyst is added.

   a. shift to the right
   b. shift to the left
   c. neither

15. What will happen to the concentration of reactants after an equilibrium reaction shifts to the left?

   a. increase
   b. decrease
   c. stay the same

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