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REVERSIBLE REACTIONS AND EQUILIBRIUM

Section Review

Objectives

- Describe how the amounts of reactants and products change in a chemical system at equilibrium
- Identify three stresses that can change the equilibrium position of a chemical system
- Explain what the value of K_{eq} indicates about the position of equilibrium

Vocabulary

- reversible reaction
- chemical equilibrium
- equilibrium position
- Le Chatelier's principle
- equilibrium constant (K_{eq})

Key Equation

$K_{eq} = \frac{[C]^c [D]^d}{[A]^a [B]^b}$
 When $aA + bB \rightleftharpoons cC + dD$

Part A Completion

Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.

- In principle, all reactions are 1 . That is, reactants go to 2 in the 3 direction, and products go to 4 in the 5 . direction.
- The point at which the rate of conversion of 6 to 7 and vice versa is equal is the 8 position. The 9 of a reversible reaction, K_{eq} , is useful for determining the position of equilibrium. It is essentially a measure of the 10 of products to reactants at equilibrium. The direction of change in the position of equilibrium may be predicted by applying 11 principle.

Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

12. The concentrations of reactants and products in a system at dynamic equilibrium are always changing.
13. A change in the pressure on a system can cause a shift in the equilibrium position.
14. For a chemical equilibrium to be established, the chemical reaction must be irreversible.
15. The K_{eq} for a certain reaction was 2×10^{-7} . For this reaction at equilibrium, the concentration of the reactants is greater than the concentration of the products.

Part C Matching

Match each description in Column B to the correct term in Column A.

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| Column A | Column B |
| 16. reversible reaction | a. state of balance in which forward and reverse reactions take place at the same rate |
| 17. chemical equilibrium | b. relative concentrations of reactants and products of a reaction that has reached equilibrium |
| 18. equilibrium position | c. When stress is applied to a system at equilibrium, the system changes to relieve the stress. |
| 19. Le Chatelier's principle | d. reaction in which conversion of reactants to products and products to reactants occur simultaneously |
| 20. equilibrium constant | e. ratio of product concentrations to reactant concentrations with each raised to a power given by the number of moles of the substance in the balanced equation |

Part D Problem

Solve the following problem in the space provided. Show your work.

