CHAPTER REVIEW

For more practice, go to the Problem Bank in Appendix D.

Types of Mixtures

SECTION 1 REVIEW

1. a. What is the Tyndall effect?
   b. Identify one example of this effect.
2. Given an unknown mixture consisting of two or more substances, explain how we could determine whether that mixture is a true solution, a colloid, or a suspension.
3. Explain why a suspension is considered a heterogeneous mixture.
4. Does a solution have to involve a liquid? Explain your answer.
5. What is the difference between an electrolyte and a nonelectrolyte?

The Solution Process

SECTION 2 REVIEW

6. a. What is solution equilibrium?
   b. What factors determine the point at which a given solute-solvent combination reaches equilibrium?
7. a. What is a saturated solution?
   b. What visible evidence indicates that a solution is saturated?
   c. What is an unsaturated solution?
8. a. What is meant by the solubility of a substance?
   b. What condition(s) must be specified when expressing the solubility of a substance?
9. a. What rule of thumb is useful for predicting whether one substance will dissolve in another?
   b. Describe what the rule means in terms of various combinations of polar and nonpolar solutes and solvents.
10. a. How does pressure affect the solubility of a gas in a liquid?
    b. What law is a statement of this relationship?
    c. If the pressure of a gas above a liquid is increased, what happens to the amount of the gas that will dissolve in the liquid, if all other conditions remain constant?
    d. Two bottles of soda are opened. One is a cold bottle and the other is at room temperature. Which system would show more effervescence and why?
11. Based on **Figure 15,** determine the solubility of each of the following in grams of solute per 100. g H_2O.
    a. $NaNO_3$ at 10°C
    b. KNO_3 at 60°C
    c. NaCl at 50°C
12. Based on **Figure 15,** at what temperature would each of the following solubility levels be observed?
    a. 50 g KCl in 100 g H_2O
    b. 100 g $NaNO_3$ in 100 g H_2O
    c. 60 g KNO_3 in 100 g H_2O
13. The enthalpy of solution for $AgNO_3$ is +22.8 kJ/mol.
    a. Write the equation that represents the dissolution of $AgNO_3$ in water.
    b. Is the dissolution process endothermic or exothermic? Is the crystallization process endothermic or exothermic?
    c. As $AgNO_3$ dissolves, what change occurs in the temperature of the solution?
    d. When the system is at equilibrium, how do the rates of dissolution and crystallization compare?
    e. If the solution is then heated, how will the rates of dissolution and crystallization be affected? Why?
    f. How will the increased temperature affect the amount of solute that can be dissolved?
    g. If the solution is allowed to reach equilibrium and is then cooled, how will the system be affected?
14. What opposing forces are at equilibrium in the sodium chloride system shown in **Figure 7?**

Concentration of Solutions

SECTION 3 REVIEW

15. On which property of solutions does the concept of concentration rely?