CHAPTER REVIEW

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

Compounds in Aqueous Solutions

SECTION 1 REVIEW

1. How many moles of ions are contained in 1 L of a 1 M solution of KCl? of $Mg(NO_3)_2$?
2. Use **Table 1** to predict whether each of the following compounds is considered soluble or insoluble:
   a. KCl
   b. $NaNO_3$
   c. AgCl
   d. $BaSO_4$
   e. $Ca_3(PO_4)_2$
   f. $Pb(ClO_3)_2$
   g. $(NH_4)_2S$
   h. $PbCl_2$ (in cold water)
   i. FeS
   j. $Al_2(SO_4)_3$
3. What is a net ionic equation?
4. a. What is ionization?
   b. Distinguish between ionization and dissociation.
5. a. Define and distinguish between strong electrolytes and weak electrolytes.
   b. Give two examples of each type.
6. What determines the strength of a solute as an electrolyte?
7. Distinguish between the use of the terms *strong* and *weak* and the use of the terms *dilute* and *concentrated* when describing electrolyte solutions.

PRACTICE PROBLEMS

8. Write the equation for the dissolution of each of the following ionic compounds in water. (Hint: See Sample Problem A.)
   a. KI
   b. $NaNO_3$
   c. $MgCl_2$
   d. Na_2SO_4
9. For the compounds listed in the previous problem, determine the number of moles of each ion produced as well as the total number of moles of ions produced when 1 mol of each compound dissolves in water.
10. Write the equation for the dissolution of each of the following in water, and then indicate the total number of moles of solute ions formed.
    a. 0.50 mol strontium nitrate
    b. 0.50 mol sodium phosphate
11. Using **Table 1,** write the balanced chemical equation, write the overall ionic equation, identify the spectator ions and possible precipitates, and write the net ionic equation for each of the following reactions. (Hint: See Sample Problem B.)
    a. mercury(II) chloride (aq) + potassium sulfide $(aq) \longrightarrow$
    b. sodium carbonate (aq) + calcium chloride $(aq) \longrightarrow$
    c. copper(II) chloride (aq) + ammonium phosphate $(aq) \longrightarrow$
12. Identify the spectator ions in the reaction between KCl and $AgNO_3$ in an aqueous solution.
13. Copper(II) chloride and lead(II) nitrate react in aqueous solutions by double displacement. Write the balanced chemical equation, the overall ionic equation, and the net ionic equation for this reaction. If 13.45 g of copper(II) chloride react, what is the maximum amount of precipitate that could be formed?

Colligative Properties of Solutions

SECTION 2 REVIEW

14. How does the presence of a nonvolatile solute affect each of the following properties of the solvent in which the solute is dissolved?
    a. vapor pressure
    b. freezing point
    c. boiling point
    d. osmotic pressure
15. Using **Figure 6** as a guide, make a graph of vapor pressure versus temperature that shows the comparison of pure water, a solution with x concentration of solute, and a solution with $2x$ concentration of solute. What is the relationship between Δt_f for the x solution and Δt_f for the $2x$ solution?