

CHAPTER 4 LEARNING OBJECTIVES

To satisfy the minimum requirements for this course, you should be able to:

Apply your understanding of the properties of aqueous solutions to:

- identify the solvent and solute(s) in a solution
- predict whether a substance is a strong electrolyte, weak electrolyte, or nonelectrolyte
- write balanced chemical equations for the dissolving of molecular compounds, ionic compounds, or acids in water

Write molecular, ionic, and net ionic equations for precipitation reactions, acid-base reactions, and oxidation-reduction (redox) reactions, and identify spectator ions

Recognize precipitation reactions and use solubility rules (Table 4.2) to predict when a precipitation reaction is likely to occur

Recognize acid-base reactions and be able to:

- explain the differences between the Arrhenius and Bronsted definitions of acids and bases
- explain the differences between strong and weak acids and between strong and weak bases
- provide the names and formulas of common acids and bases (see general chemistry pro-knowledge) and classify acids as either monoprotic, diprotic, or triprotic

Recognize oxidation reduction (redox) reactions and be able to:

- determine the oxidation numbers of atoms involved in a redox reaction
- identify the compounds being oxidized and reduced and the oxidizing and reducing agents
- recognize the following types of redox reactions: combination, decomposition, combustion, displacement, and disproportionation
- use the activity series to predict whether a displacement reaction will occur

Perform the following calculations involving concentration:

- calculate the molarity, solution volume, or number of moles of solute given any two of these quantities
- dilution calculations
- titration calculations for both acid-base and redox reactions