

CHAPTER 15 LEARNING OBJECTIVES

To satisfy the minimum requirements for this course, you should master the following learning objectives.

Discuss the general properties of Bronsted acids and bases by

- identifying Bronsted-Lowry acids and bases
- identifying the conjugate base associated with a given Bronsted acid.
- identifying the conjugate acid associated with a given Bronsted base.

Explain what is meant by the autoionization of water and write the K_w expression for the process.

Define pH and given pH, $[H^+]$, or $[OH^-]$ be able to calculate the other two variables.

Explain the difference between weak and strong acids/bases and

- be able to give the names and formulas of common strong acids and bases. (see Pro-Knowledge)
- calculate the pH of aqueous solutions of strong acids and bases given their concentrations.
- recognize how amines act as weak bases and how carboxylic acids ionize in aqueous solution.
- rank a series of weak acids or bases by acid or base strength given their K_a or K_b 's.
- calculate the pH for a weak acid solution in water, given the acid concentration and K_a
- calculate K_a given the acid concentration and pH
- write stepwise ionization equations and the corresponding equilibrium-constant expressions for polyprotic acids.
- calculate the pH for a weak base solution in water, given the base concentration and K_b .
- calculate K_b given the base concentration and pH.
- be able to calculate percent ionization for an acidic or basic solution.

Determine the relationship between the strength of an acid and that of its conjugate base and be able to calculate K_b using a given K_a , and vice-versa.

Predict whether a salt solution will be acidic, basic, or neutral and be able to calculate the pH.

Explain how acid strength relates to the molecular structure of the acid.

Be able to predict whether an oxide is acidic or basic when dissolved in water.

Be able to explain the mechanism for the interaction of a Lewis acid with a Lewis base.

Understand the meaning of the Key Words on page 702.