CHAPTER 16 LEARNING OBJECTIVES

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

Discuss the general properties of Brønsted acids and bases by
- identifying Brønsted-Lowry acids and bases.
- identifying the conjugate base associated with a given Brønsted acid.
- identifying the conjugate acid associated with a given Brønsted 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 Chemistry Reference Sheet)
- calculate the pH of aqueous solutions of strong acids and bases given their concentrations.
- write chemical equations to show how amines act as weak bases and how carboxylic acids act as weak acids in aqueous solution.
- rank a series of weak acids or bases by acid or base strength given their $K_a$ or $K_b$ values.
- 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.

Generate an ICE table and:
- calculate the pH for a weak acid solution in water, given the initial acid concentration and $K_a$.
- calculate $K_a$ given the initial acid concentration and pH.
- calculate the pH for a weak base solution in water, given the initial base concentration and $K_b$.
- calculate $K_b$ given the initial base concentration and pH.

Write stepwise ionization equations and the corresponding equilibrium-constant expressions for polyprotic acids.

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