Prescribed Learning Outcomes: Chemistry 12

It is expected that students will:

REACTION KINETICS

A1 demonstrate awareness that reactions occur at differing rates
A2 experimentally determine rate of a reaction
A3 demonstrate knowledge of collision theory
A4 describe the energies associated with reactants becoming products
A5 apply collision theory to explain how reaction rates can be changed
A6 analyse the reaction mechanism for a reacting system
A7 represent graphically the energy changes associated with catalyzed and uncatalyzed reactions
A8 describe the uses of specific catalysts in a variety of situations

DYNAMIC EQUILIBRIUM

B1 explain the concept of chemical equilibrium with reference to reacting systems
B2 predict, with reference to entropy and enthalpy, whether reacting systems will reach equilibrium
B3 apply Le Châtelier's principle to the shifting of equilibrium
B4 apply the concept of equilibrium to a commercial or industrial process
B5 draw conclusions from the equilibrium constant expression
B6 perform calculations to evaluate the changes in the value of K_{eq} and in concentrations of substances within an equilibrium system

SOLUBILITY EQUILIBRIA

C1 determine the solubility of a compound in aqueous solution
C2 describe a saturated solution as an equilibrium system
C3 determine the concentration of ions in a solution
C4 determine the relative solubility of a substance, given solubility tables
C5 apply solubility rules to analyse the composition of solutions
C6 formulate equilibrium constant expressions for various saturated solutions
C7 perform calculations involving solubility equilibrium concepts
C8 devise a method for determining the concentration of a specific ion

NATURE OF ACID AND BASES

D1 identify acids and bases through experimentation
D2 identify various models for representing acids and bases
D3 analyse balanced equations representing the reaction of acids or bases with water
D4 classify an acid or base in solution as either weak or strong, with reference to its electrical conductivity
D5 analyse the equilibria that exist in weak acid or weak base systems
D6 identify chemical species that are amphiprotic

Prescribed Learning Outcomes: Chemistry 12

Acids and Bases: Quantitative Problem Solving

E1 analyse the equilibrium that exists in water
E2 perform calculations relating pH, pOH, $[H_3O^+]$, and $[OH^-]$
E3 explain the significance of the K_a and K_b equilibrium expressions
E4 perform calculations involving K_a and K_b

Applications of Acid-Base Reactions

F1 demonstrate an ability to design, perform, and analyse a titration experiment involving the following:
- primary standards
- standardized solutions
- titration curves
- appropriate indicators

F2 describe an indicator as an equilibrium system
F3 perform and interpret calculations involving the pH in a solution and K_a for an indicator
F4 describe the hydrolysis of ions in salt solutions
F5 analyse the extent of hydrolysis in salt solutions
F6 describe buffers as equilibrium systems
F7 describe the preparation of buffer systems
F8 predict what will happen when oxides dissolve in rain water

Oxidation-Reduction

G1 describe oxidation and reduction processes
G2 analyse the relative strengths of reducing and oxidizing agents
G3 balance equations for redox reactions
G4 determine the concentration of a species by performing a redox titration

Applications of Redox Reactions

H1 analyse an electrochemical cell in terms of its components and their functions
H2 describe how electrochemical concepts can be used in various practical applications
H3 analyse the process of metal corrosion in electrochemical terms
H4 analyse an electrolytic cell in terms of its components and their functions
H5 describe how electrolytic concepts can be used in various practical applications