SCH 4U

Redox and Electrochemical Cells

Students will be able to:

Redox Reactions

Objective 1

- define or explain the terms: oxidation, reduction, redox, oxidation number, oxidizing agent, reducing agent, oxidation state

Objective 2

- state the meaning of and rules for determining oxidation numbers and assign oxidation numbers based on the given rules

Objective 3

- tell the difference between a redox and a non redox reaction

Objective 4

- identify the substance being oxidized, reduced or acting as an oxidizing agent or reducing agent in any given redox reaction

Objective 5

- develop skill in balancing chemical redox reactions using oxidation numbers, followed by charge and mass balancing

Electrochemical Cells

Objective 6

- define the following redox terms: electrode, anode, cathode, half-cell, electron flow, ion flow, electrical potential or voltage, electrochemical reaction, electrochemical cell, galvanic cell, electrolytic cell, electrolysis, salt bridge, electrolytes, internal circuit and external circuit

Objective 7

- differentiate between electrolytic cells (conversion from electrical to chemical energy) and galvanic cells (conversion from chemical to electrical energy)

Objective 8

- list some practical applications of galvanic and electrolytic cells

Objective 9

- define or explain the following redox terms: spontaneity, corrosion, sacrificial anode, cathodic protection

- list the conditions necessary for corrosion to occur and explain methods of preventing it from happening

Objective 10

- recognize the hydrogen half-cell as an arbitrary standard for the standard reduction potentials table (E° values)

Objective 11

- use standard reduction tables to identify strong oxidizing and strong reducing agents and to qualitatively predict the spontaneity of redox reaction

Objective 12

- develop skill in determining standard cell potentials using a table of half cell reduction potentials and in predicting if a redox reaction is spontaneous or not

Objective 13

- given a cell diagram or a cell short form designation, locate and label the following: anode, oxidation location, anode half-reaction, cathode, reduction location, cathode half-reaction, half-cell, electron flow, positive ion and negative ion flow, salt bridge, external circuit, internal circuit, half- cell and cell voltages and electrolyte