

101 Chem. 3+1 & 103 Chem. 3+0

General Chemistry

Reference: Chemistry 11th ED.

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I. Introduction

1.4 Units of Measurement

II. Stoichiometry

(7 Lectures)

- 3.1 Chemical Equations
- 3.2 Some Simple Patterns of Chemical Reactivity
- 3.3 Formula Weights
- 3.4 Avogadro's Number and the Mole
- 3.5 Empirical Formulas from Analyses
- 3.6 Quantitative Information from Balanced Equations
- 3.7 Limiting Reactants and Theoretical yields
- 4.5 Concentrations of Solutions
- 13.4 Ways of Expressing Concentrations

III. Gases

(6 Lectures)

- 10.1 Characteristics of Gases
- 10.2 Pressure
- 10.3 The Gas Laws
- 10.4 The Ideal Gas Equation
- 10.5 Further Applications of the Ideal Gas Equation
- 10.6 Gas Mixtures and Partial Pressures
- 10.7 Kinetic Molecular Theory
- 10.8 Molecular Effusion and Diffusion
- 10.9 Real Gases Deviations from Ideal Behavior

First Mid Term Exam

IV. Thermochemistry and Thermodynamics

(6 Lectures)

- 5.1 The Nature of Energy
- 5.2 The First Law of Thermodynamics
- 5.3 Enthalpy
- 5.4 Enthalpies of Reaction
- 5.5 Calorimetry (Heat Capacity and Specific Heat-Constant Pressure Calorimetry), Bomb calorimetry (constant volume calorimetry)
- 5.6 Hess's Law
- 5.7 Enthalpies of Formation

V. Properties of Solutions

(6 Lectures)

13.1 The Solution Process

13.3 Factors Affecting solubility (Pressure Effects and Temperature Effects)

13.5 Solutions of Two Volatile Liquids, Colligative Properties of Non-electrolyte Solutions and Electrolyte solutions (van't Hoff Factor)

VI. Chemical Kinetics

(5 Lectures)

14.1 Factors That Affect Reaction Rates

14.2 Reaction Rates

14.3 The Rate Law: The Effect of Concentration on Rate

14.4 The Change of Concentration with Time. The Half-life (First Order Reactions Only)

14.5 Temperature and Rate

Second Mid Term Exam Limit

VII. Chemical Equilibrium

(5 Lectures)

15.1 The Concept of Equilibrium

15.2 The Equilibrium Constant

15.3 Interpreting and working with Equilibrium Constants

15.4 Heterogeneous Equilibria

15.5 Calculating Equilibrium Constants

15.6 Applications of Equilibrium Constants

15.7 Le Chatelier's Principle and its Applications on Equilibria

VIII. Acid Base Equilibria

(7 Lectures)

16.1 Acids and Bases

16.2 Bronsted-Lory Acids and Basis

16.3 The Autoionization of Water

16.4 The pH Scale

16.5 Strong Acids and Bases

16.6 Weak Acids

16.7 Weak Bases

16.8 Relationship Between K_a and K_b

16.9 Acid-Base Properties of Salt Solutions

17.1 The Common Ion Effect

17.2 Buffered Solutions

17.4 Solubility Equilibria, the solubility product K_{sp}