

Chem 103
General Chemistry (1)
Reference: Chemistry 11th ED.

By

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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}