

M.Sc. SEMESTER-III
Physical Chemistry
CHNN-605 (P)-(A)-SE

Unit 1: **50% (15 Hours)**

(A) Atomic Absorption Spectroscopy

Introduction, Principle, Grotrian Diagrams, Detection of Non-metals by Atomic Absorption Spectroscopy, Difference Between Atomic Absorption Spectroscopy and Flame Emission Spectroscopy, disadvantage of atomic absorption spectroscopy, Instrumentation, Operation of Atomic Absorption Spectrometer, Single and Double beam Atomic Absorption Spectrometer, Detection Limit and Sensitivity.

(B) Flame Photometry

Introduction, Limitation of Flame Photometry, General principle of Flame Photometry, Instrumentation, Effect of Solvent in Flame Photometry, Instruments, Application of Flame Photometry, Limitation of Flame Photometry.

Unit 2: **50% (15 Hours)**

(A) Conductometric Measurements

Introduction, Some Important Laws, Definition and Relations, Effect of dilution, Conductance Measurements, Application of Conductance Measurements, Types of Conductometric Titrations, Advantage of Conductometric Titrations, Disadvantage of Conductometric Titrations.

(B) Measurement of pH

Introduction, Determination of pH, Ion selective electrode, Instrumentation, Application of pH Measurement.

(C) Potentiometric Titration

Introduction, Instrumentation, Types of Potentiometric Titration, Variation in Potentiometric Titration, Advantage of Potentiometric Titration.

Book:

1. Instrumental Methods of Chemical Analysis by Gurdeep R Chatwal, Sham K Anand Himalaya Publishing House.

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Unit 1: The Gaseous State (Ideal Gases): **50% (15 Hours)**

The Kinetic Molecular Theory of gases, Pressure Of an Ideal Gas, Derivation of the gas laws, The ideal gas , equation, Kinetic energy and temperature, The Maxwell distribution Of molecular velocities, The Maxwell distribution Of molecular energies, Types of molecular velocities, Derivation of expression for molecular velocities, Expensive and compressibility, collision parameters, collision diameter, collision cross section, collision number, collision frequency, Mean free path, Transport Properties, thermal conductivity, Viscosity, Diffusion, Summary of transport properties in a gas, the degree of freedom of a gaseous molecules, the principle of equipartition of energy, Contribution to heat capacity of an ideal gas, The Barometric Formula, Questions and answers.

Unit 2: The Gaseous State (Real Gases) **50% (15 Hours)**

Deviation of real gases from ideal behaviour, Explanation of deviation, Equation of state for real gases, The Vander Waal equation of state, Other equation of state, The virial equation of state, intra molecular forces, The Lennard – Jones (6-12) Potential, The second virial coefficient, the critical phenomena, P-V isotherm of carbon dioxide, The Vander Waal equation and critical state, Molar Mass and Density of real gas, Liquefaction of gas, Production of low temperatures by adiabatic demagnetization, Question and Problems.

Book:

1. Principle of Physical Chemistry By Puri Sharma Pathania.
2. Advanced physical Chemistry By Gurdeep Raj.