Unit:–I Wave Mechanics :

- Black Body Radiation & Quantum Theory.
- Photo electric effect : Wave particle duality of radiation.
- Compton effect.
- Basic postulates of quantum Mechanics.
- Operator : Definition, Algebra of operators, Addition, Multiplication,Commutative properties, Linear operator, Commutator operators,Laplassian operator.
- Free particle system.
- Particle in one dimension box.

Unit:–II Acid-Base Properties :

- Proton acids – Bases and Lewis acids - Bases.
- Scale of acidity - Basicity.
- Factors effecting on acidity and basicity of compounds.
- Resonance effect (Drawing resonance structures and the conditions for resonance).
- Inductive and electronic effects.
- Effect of hybridization.
- Steric effects.
- Effects by hydrogen bonding.

Unit:–III Thermodynamics :· Phase in Equilibrium.

- Clapeyron-clausius equation
- Integrated form of clapeyron-clausius equation.
- Application of clapeyron-clausius equation from various phase in equilibrium.
- Trouton's law.
- Craft equation. H}GvZ_!# YL
- Elevation in Boiling point.(Kb)
- Depression of freezing point. (Kf)

- **Partial molar Properties.**
- Partial molar free energy.
- Concept of Chemical Potential.
- Gibs-Duhem equation.
- Variation of chemical potential with temperature and pressure.
- Duhem-Margules equation.
- **Numericals.**

Unit:–I Chemistry of Noble gases :

· Introduction

· Discovery of Noble gases: Occurrence, Isolation of Non-radioactive of Noble gases.

· Electronic configuration of Noble gases.

· Compound of Noble gases.

    1) Non real compounds prepared by different methods.
    2) True compounds: XeF_2, XeF_4, XeF_6, $XeOF_2$, XeO_3, XeO_2F_2, XeO_4, $XeOF_4$.

Unit:–II

(A) Amino acids & Peptides :

· **Amino acids.**

· Introduction.

· Classification and nomenclature.

· Dipolar ion structure and Isoelectric point.

· Synthesis of amino acids (Grabriel Phthalimide, Straker, Fisher-Malonic ester).

· Reactions of amino acid.

· **Peptides.**

· Geometry of peptide linkage.

· Synthesis of peptides (Bergmann Method, Shehan Method).

· Determination of structure of peptide by terminal residue analysis.

(B) Electrophillic Aromatic Substitution :

· Introduction.

· Effect of substituent groups.

· Determination of orientation. 02/07/2013

· Classification of substituent groups. Н}GvZ_!# YL

· Orientation in disubstitued benzenes.

· Orientation and synthesis.

· Mechanism of …Nitration, Sulfonation, Fridal - kraft alkylation and
Helogenation.

· Electrophillic aromatic substitution (Two steps).

· Theory of reactivity.

- Theory of orientation.

- Electron release via resonance.

Unit:–III Physical Properties & Molecular Structure:The Vacancy Theory of Liquid.

- Vapor-Pressure

- Surface tension
    1) Measurement of surface tension by stalagmometer.
    2) Perachore and its applications.

- Viscosity
    1) Measurement of viscosity by Ostwald-viscometer

- Refractive index
    1) Specific refraction.
    2) Molar refraction.
    3) Measurement of Refractive index by Abbe's Refractometer.

- Optical activity
    1) Measurement of Optical activity by Polarimeter.

- Dipole moment and its measurements & its application.

- Numericals.

Organic Chemistry (4 hours per practical)

· Separation of Organic Mixture. (Any 7 out of 10)

Mixture Containing Two Compounds (Only Water Insoluble Solid Compounds taken)

Physical Chemistry.(Any 7 out of 10) (4 hours per practical)
1) Conductrometric titration:- HCl / CH3COOH Vs NaOH
2) Conductrometric titration:- HCl Vs NH4OH
3) pH- metric titration:-
a. Calibration of pH - meter by 4 - pH buffer
b. HCl Vs NaOH
4) Determine the Dissociation constant of the acid of mixtures of
CH3COONa and CH3COOH by determine the PH
5) Determine the specific refraction and molar refraction of the given
liquid A, B and mixture C (A+B) and calculate the percentage
composition of A and B in the mixture C by Abbe's Refractrometer.
6) Determine the molar refraction CH3COOC2H5 ,CH3COOC3H7 and
CH3COOC4H9 and show the constancy of reaction equivalent of -CH2
– Group by Abbe's Refractrometer.
7) To determine the viscosity of a different mixture of liquid A and B
and determine the percentage composition of unknown mixture by
graphical method.
8) To determine the surface tension and compare cleaning-efficiency of
two samples of a detergent or soap with stalagmo meter.
9) To study kinetic reaction of decomposition of H2O2 catalysis by iodine
ion (Clock reaction)
10) Find the solubility and heat of solution of the given organic acid at
two different temperatures

University Exam Pattern: (Two Days per Batch)
Name of Practical Day Marks
Lab. Course-I
Organic Separation One day (5 hours) 40+5(viva) = 45

Lab. Course-II
Physical Chemistry One day (5 hours) 40+5(viva) = 45
Journal 10
Total 100