Paper VII A

ST. JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS) VISAKHAPATNAM

VI SEMESTER CHEMISTRY TIME: 3Hrs/week

CH 6201 (3) SOME SPECIAL ASPECTS OF CHEMISTRY Max. Marks: 60

W.e.f. 2017 – 2018 'AC' Batch SYLLABUS

OBJECTIVES: To enable the students to

- gain thorough knowledge of advanced topics of Physical Chemistry such as Thermodynamics.
- understand the principles of Stereochemistry, the knowledge of which is essential for the understanding of mechanism of organic reactions.
- Gain an insight onto nitrogenous biomoleules

COURSE:

UNIT – I

1. First Law of Thermodynamics: The first law of thermodynamics-statement, definition of internal energy and enthalpy. Heat capacities and their relationship. Joule-Thomson effect-coefficient. Calculation of w, for the expansion of perfect gas under isothermal and adiabatic conditions for reversible processes. Conditions for maximum work. Temperature dependence of enthalpy of formation- Kirchoff s equation.

2. Second Law of Thermodynamics: Second law of thermodynamics. Different Statements of the law. Carnot cycle and its efficiency. Carnot theorem. Concept of entropy, entropy as a state function, entropy changes in reversible and irreversible processes. Entropy changes in spontaneous and equilibrium processes.

UNIT – II

3. Stereo isomerism – I:

Stereochemistry of carbon compounds: Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae. D,L and R,S configuration notations. Optical isomerism: Optical activity- wave nature of light, plane polarised light, optical rotation and specific rotation. Chiral molecules- definition and criteria (Symmetry elements) - Definition of enantiomers and diastereomers – Explanation of optical isomerism with examples Glyceraldehyde, Lactic acid, Alanine, Tartaric acid, 2,3-dibromobutane.

4. Stereo Isomerism – II:

Geometrical Isomerism of Alkenes – Cis-Trans & E-Z Configurations – Maleic and Fumaric Acids. Asymmetric synthesis - Definition – Asymmetric synthesis, enantiomeric excess, diastereomeric excess, stereospecific reactions definition, example, dehalogenation of 1,2 dibromides, Stereoselective reactions, definition, example, acid catalysed dehydration of I-phenyl propanol.

UNIT – III:

5. Nitrogenous Biomolecules

Amino acids and proteins Introduction: Definition of Amino acids, classification of Amino acids into alpha, beta, and gamma amino acids. Natural and essential amino acids - definition and examples, classification of alpha amino acids into acidic, basic and neutral amino acids with examples. Methods of synthesis: General methods of synthesis of alpha amino acids (specific examples - Glycine, Alanine, valine and leucine) by following methods: a) from halogenated carboxylic acid b) Malonic ester synthesis c) strecker's synthesis.

6. Physical and chemical properties: Zwitter ion structure - salt like character - solubility, melting points, amphoteric character, definition of isoelectric point. Chemical properties: General reactions due to amino and carboxyl groups - lactams from gamma and delta amino acids by heating peptide bond (amide linkage). Structure and nomenclature of peptides and proteins.

REFERENCES:

1. 'Stereochemistry and Mechanism through Solved Problems' – P.S.Kalsi, III Edn. Wiley Eastern Limited, New Delhi 1995
2. 'Unified Chemistry' – Y.R. Sharma and R. Rama Rao, Part-II, Andhra Edition – Kalyani Publishers, New Delhi 2003
3. Organic Chemistry – Robert T. Morrison and Robert N. Boyd, VI Edition – Prentice Hall of India Pvt. Ltd., New Delhi 1989
4. Text Book of Physical Chemistry – P.L. Soni and O.P. Dharmarha, XXEdn, Sultan Chand & Sons, New Delhi 1994
5. Essential of Physical Chemistry – B. S. Bahl and G. D. Tuli, 25th Edition, Sultan Chand & Sons, New Delhi 2005
6. Text Book of Organic chemistry by I L Finar Vol I.
7. Elements of Physical Chemistry – B.R. Puri, L.R. Sharma & Madan S. Pathania, 43rd Edition, 2008,Vishal Publishing Co., Jalandhar.
8. Stereochemistry by P.S.Kalsi
9. Stereochemistry of Organic compounds by D. Nasipuri
10. Advanced physical chemistry by Bahl and Tuli

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VI SEMESTER **CHEMISTRY** **TIME: 3 Hrs/Week**

CH 6254 (1) **GRAVIMETRIC ANALYSIS** **Max. Marks: 50**

w. e .f 2017-2018'AC' batch **PRACTICAL SYLLABUS**

OBJECTIVES: To enable the students to –

- Apply gravimetric principles for quantitative estimation of Barium and Nickel
- Gain insight on application of column and thin layer chromatography for qualitative chemical analysis

1. Estimation of Barium
2. Estimation of Nickel
3. Interpretation of IR Spectral Analysis of the following functional groups with examples (Demonstration only) a) Hydroxyl groups, b) Carbonyl groups, c) Amino groups, d) Aromatic groups

REFERENCES :

1. Instrumental methods of chemical analysis B.K.Sharma GOEL Publishing House, Meerut, 26th Edition.
2. Practical Organic Chemistry – G Mann & B.C.Saunders ELBS & Long man Group Ltd – IV Edition.
1. Vogels's T.B. of Practical Organic Chemistry B S Furnis A J Hannaford, PWG Smith & AR Tatchell – ELBS V Edition.