ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAMI SEMESTERCHEMISTRYTIME: 4Hrs/WeekCH 1201 (3)INORGANIC & ORGANIC CHEMISTRYMax. Marks: 100w.e.f: 2017 – 2020 ('17AE'- Batch)SYLLABUS

OBJECTIVES: To enable the students to –

- Acquire knowledge about *p*-block elements, some selective component preparations, properties and their structures.
- Gain the knowledge and acquire ability in presenting the various molecular structures in their respective special arrangements. To be able to formulate and discriminate VSEPR theory & MOT theory.
- Learn basics of Organic Chemistry in the topics of Basic concepts of Organic Chemistry and Types of organic reactions.
- Study the structure of Benzene, Orientation which is essential for the understanding of Basics and Mechanisms of Organic Chemistry.

COURSE:

UNIT – I:

1. p-block elements:

- a. Group-13: Synthesis and structure of diborane and higher boranes $(B_4H_{10} \text{ and } B_5H_9)$, boron-nitrogen compounds $(B_3N_3H_6 \text{ and } BN)$
- b. Group 14: Preparation and applications of silanes and silicones.
- d. Group 15: Preparation and reactions of hydrazine, hydroxylamine.
- e. Group 16: Classifications of oxides based on (i) Chemical behaviour and (ii) Oxygen content
- f. Group-17: Inter halogen compounds and pseudo halogens.
- 2. CHEMICAL BONDING: Valence bond theory, hybridization, Valence bond theory applied to CIF₃, Br F₅, Ni(CO) ₄, XeF₂. Molecular Orbital theory: Linear combination of Atomic orbitlas, M.O. diagrams of some homo-nuclear and hetero nuclear diatomic molecules like N_2, O_2, CO , NO systems; their bond order and magnetic property. Comparison of valence bond and molecular orbital theories.

UNIT – II:

- **3. STRUCTURAL THEORY IN ORGANIC CHEMISTRY:** Types of bond fission and organic reagents. (Electrophilic, Nucleophilic and free radical reagents including neutral molecules H₂O, NH₃). Reaction Intermediates: Free radicals, Carbonium ions, carbanions, carbenes and nitrenes. Bond polarization: Factors influencing the polarization of covalent bonds, electro negativity inductive effect. Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance or Mesomeric effect, application to (a) acidity of phenol, and (b) acidity of carboxylic acids. Hyper conjugation and its application to stability of carbonium ions,
- **4. SOME IMPORTANT ASPECTS OF HYDROCARBONS:** Types of Organic reactions: Addition electrophilic, nucleophilic and free radical. Substitution electrophilic, nucleophilic and free radical. Elimination- Examples. Addition of halogen to ethylene and its mechanism. Addition of HX, Markonikov's rule, addition of H₂O, HOX, H₂SO₄ with mechanism and addition of HBr in the presence of peroxide (anti Markonikov's addition). Dienes- Types of dienes, 1,2 and 1,4 addition of HBr to 1,3 –butadiene and Diel's Alder reaction. Acidity of acetylene, electrophilic addition of X₂, HX, H₂O (Tautomerism), Oxidation with KMnO₄, OsO₄, reduction and Polymerization reaction of acetylene.

UNIT – III:

5. ALICYCLIC HYDROCARBONS (CYCLOALKANES): Nomenclature- Preparation by Freunds method, Wislicenus method. Properties - reactivity of cyclopropane and cyclobutane by comparing with alkanes, Stability of cycloalkanes - Baeyer's strain theory, Sachse and Mohr predictions and Pitzer's strain theory. Conformational structures of cyclobutane, cyclopentane, cyclohexane.

6. BENZENE AND ITS AROMATICITY:

- 1. Concept of resonance, resonance energy. Heat of hydrogenation, heat of combustion of benzene, mention of C-C bond lengths and orbital picture of benzene.
- 2. Concept of aromaticity aromaticity (definition), Huckel's rule application to bezenoid (Benzene, Napthalene, Anthracene) and Non-Benzenoid compounds cyclo propenyl cation, cyclopenta dienyl anion and tropylium cation).
- Reactions General mechanism of Electrophilic substitution, mechanism of nitration. Friedel Craft's alkylation and acylation. Orientation of aromatic substitution – Definition of ortho, para and meta directing groups. Ring activating and deactivating groups with examples (Electric interpretation of various groups like NO₂ and phenolic). Orientation of i. Amino, methoxy and methyl groups ii. Carboxy, nitro, nitrile, carboxyl and sulfonic acid groups. iii. Halogens (Explanation by taking minimum of one example from each type).

REFERENCES:

- 1. Inorganic Chemistry by P.L.Soni-Sulthan Chand & Sons-Educational Publishers, New Delhi.
- 2. Text Book of Inorganic Chemistry by Huhey-E.A.Keiter: R.A.Keiter-IV Harpor Collins College Publishers.
- Theoretical Inorganic Chemistry by Mc Day & J.Selbin-Reinhold Publishing Corporation, New York-Affiliated East-West Press Pvt. Ltd..., New Delhi.
- Unified course in Chemistry (Vol.1) Y.R.SHARMA & Dr. K.RAMA RAO kalyani publishers Ludhiana Fourth Edition, 2014.
- 5. Unified course in Chemistry (Vol.1) Dr. O.P.Agarwal & AVINASH Agarwal Jai Prakash Nath & Co., Meerut. Sixty Fourth Edition, 2014.
- Organic Chemistry Robert T.Morrison & Robert B.Boyd Published by Prentice Hall or India Pvt. Ltd., New Delhi – 110001.
 - 7. Advanced Organic chemistry B.S.Bahl & Arun Bahl S.Chand & Company Ramnagar, New Delhi 110055.
- 8. A Text Book of Organic chemistry by I L Finar Vol I

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAMI SEMESTERCHEMISTRYCH 1251 (2)QUALITATIVE INORGANIC ANALYSIS – IMax. Marks: 50w.e.f 2017-2018('17AE')PRACTICAL SYLLABUS - I A

OBJECTIVE: To enable the students to acquire skills necessary for qualitative analysis

of inorganic salts containing one anion and one cation.

Analysis of simple salt containing one anion and cation from the following

Anions: Sulphate, chloride, bromide, nitrate, acetate, borate, phosphate, tartrate, oxalate.

cations: Lead, copper, cadmium, iron, aluminum, zinc, chromium, manganese, nickel, cobalt, calcium, strontium, barium, potassium, ammonium and Magnesium.

REFERENCES:

- 1. Text Book of Macro and semi micro qualitative analysis, A. I. Vogel, Longman Endland.
- 2. Semi micro Qualitative Analysis, F. J. Welcher.
- 3. Inorganic Semi micro Qualitative Analysis V. V. Ramanujan.

OBJECTIVES:

- 1. To enable the students to apply physical laws to chemical phenomena
- 1. To enable the students to study the structure of matter and the tools employed for its study.
- 2. To enable the students to have basic idea about speeds of reactions and to understand higher order reactions and derive their rate constants in order to predict the course of the reaction.
- 3. To enable the students to get the proper knowledge about surface chemistry .
- 4. To enable the students to know fundamentals of Photochemistry.

COURSE:

UNIT – I:

1. GASEOUS STATE: Ideal and real gases ; Deviation of Real gases from ideal behaviour, deviation from Boyle's law, P-V Isotherms of real gases, compressibility factor Z, causes for deviation ; Vanderwaal's equation of state, volume and pressure corrections, Andrew's isothems of CO₂, continuity of state, critical phenomenon, critical constants, Vanderwaal's equation and critical state, Relationship between critical constants and Vanderwaal's constants, Law of corresponding states

(Reduced equation of state), Joule Thomson effect.

LIQUID STATE: Structural differences between solids, liquids and gases. Liquid crystals, the mesomorphic state. Classification of liquid crystals into Smectic and Nematic. Differences between liquid crystal and solid/liquid. Application of liquid crystals.

2. CHEMICAL KINETICS: Introduction – Types of reactions – Rate of reaction – rate law - order of reaction – molecularity – zero order reactions : explanation, examples and derivation of rate constant – I order reactions : derivation of rate constant, examples and numerical problems – II order reactions : derivation of rate constant, examples and numerical problems – III order reaction : derivation of rate constant, examples and numerical problems – III order reaction : derivation of rate constant and examples – Units of rate constant – pseudo molecular reactions – methods of determination of order of reaction : Integration method, fractional change method, Van't Hoff's differential method, Graphical method & Ostwald's isolation method. Collision theory of bimolecular reactions (qualitative treatment) Effect of temperature on the rate of reaction. Arrhenius equation and calculation of activation energy.

UNIT – II:

3. SURFACE CHEMISTRY-COLLOIDAL STATE: Introduction, Classification of colloids, lyophilic and lyophobic colloids; preparation, purification. General properties of colloids : kinetic (Brownian movement), optical (Tyndall effect) and electrical (Electrophoresis) properties of colloids ; Origin of charge on colloidal particles, preferential adsorption of common ion, Electric double layer (Helmholtz and Stern) theories, Zeta potential, coagulation of colloids, Hardy – Schulze's rule, flocculation value, stability of colloids, protection of colloids, gold number. Emulsions : Liquids in liquids (emulsions) preparation, properties, uses. Liquids in solids (gels) preparation, uses.

4. ADSORPTION: Physical adsorption, chemisorption. differences, Freundlisch, Langmuir adsorption isotherms. Applications of adsorption.

CATALYSIS: Introduction, general characteristics of catalytic reactions, homogeneous and heterogeneous and autocatalysis reactions, comparison with examples, Examples for acid/ base catalyzed reactions -inversion of cane sugar; conversion of acetone to diacetone alcohol, hydrolysis of esters, mutarotation of glucose; Catalytic activity at surfaces, mechanisms of heterogenous catalysis, Langmuir – Hinshel Wood mechanism.

ENZYME CATALYSIS: Characteristics of enzyme catalysis, Kinetics of enzyme catalyzed reactions, Michaelis – Menten law, significance of Michaelis constant (Km), factors affecting enzyme catalysis, effect of temperature, pH, concentration and inhibitor, catalytic efficiency.

UNIT – III:

- 5. PHASE EQUILIBRIUM: Introduction, phase, component and degrees of freedom, Gibb's phase rule equation, Thermodynamic Derivation of Gibbs phase rule. Construction of phase diagram-Application of phase rule to : i. One component system water system ii. Two component systems: simple eutectic systems, Lead –Silver system, desilverisation of lead (Pattinson's process), NaCI -water system, freezing mixtures.
- 6. PHOTOCHEMISTRY: General features of absorption Beer-Lambert's law and its limitations, transmittance. Absorbance, and molar absorptivity. Single and double beam spectrophotometers. Application of Beer-Lambert law. Interaction of radiation with matter, photoprocesses, differences between photochemical and thermochemical reactions; photophysical processes and photochemical processes. Laws governing photo chemical reactions, Grotthus - Draper's law, Stark - Einstein's law of photochemical equivalence ; Quantum efficiency, high and low quantum yields, photochemical reactions – H₂Cl₂ and H₂Br₂ reactions ; Jablonski diagram depicting various processes occurring in the excited state, Luminescence, Fluorescence, Phosphorescence.

REFERENCE BOOKS:

- 1. Text Book of physical chemistry P.L.Soni and O.P. Dharmarha, 20th Edition, Sultan Chand and Sons, New Delhi .
- 1. Elements of Physical Chemistry B.R. Puri, L.R. Sharma & Madan S. Pathania, 43rd Edition, 2008, Vishal Publishing Co., Jalandhar.
- Essentials of physical chemistry B.S.Bahl and G.D. Tuli, 25th Edition, Sultan Chand and Sons, New Delhi.
- 3. Physical Chemistry , Part II R.K.Prasad, Bharati Bhawan, Patna.
- 4. Numerical Chemistry Dr. P.Bahadur G.R.Bathia and Sons, Muzaffarnagar, U.P.
- 5. Principles of physical chemistry by Prutton and Marron
- 6. Text book of physical chemistry by K L Kapoor
- Unified Chemistry (Vol.2) (B.Sc. I) Y.R.Sharma & Dr. K.Rama Rao Kalyani Publishers, Ludhjana. Sixth Revised Edition, 2010.
- Unified Chemistry (Vol.2) (B.Sc. II) Y.R.Sharma & Dr. K.Rama Rao Kalyani Publishers, Ludhjana. Sixth Revised Edition, 2010.
 - 10. Unified Chemistry (Vol.2) (B.Sc. III) Y.R.Sharma & Dr. K.Rama Rao Kalyani Publishers, Ludhjana. Sixth Revised Edition, 2010.

OBJECTIVES: To enable the students to -

- Conduct experiments designed for volumetric analysis
- Interpret experimental/investigative data
- Apply theory-based tools to solve simple chemical problems related to subject areas
- 1. Determination of Fe (II) using KMnO₄ with oxalic acid as primary standard.
- 2. Determination of Zn using EDTA
- 3. Determination of Mg using EDTA

REFERENCES:

- Vogel's Text Book of Quantitative Inorganic Analysis, IV Edition J.Bassett, R.C.Denny, G.H.Jeffery, J.Mendhan ELBS/Longman, England
- 2. Practical Monograph prepared by the Department.

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

II SEMESTER CH 2201 (3) w.e.f 2017-2020 ('17AE')

CHEMISTRY GENERAL & ORGANIC CHEMISTRY SYLLABUS

4 Hrs/Week Max.Marks:100

OBJECTIVES: To enable the students to

- 1. To gain insight into toxic chemicals and environmental quality
- 2. To motivate the students to behave in a more socially responsible manner.
- 3. Learn basics of Organic Chemistry in the topics of Basic concepts of Organic Chemistry and Types of organic reactions.
- 4. Apply the knowledge for the synthesis of various organic compounds through synthetic applications of Grignard reagents, Aceto acetic ester and ethylmalonate.

COURSE

UNIT – I:

1. ENVIRONMENTAL CHEMISTRY – I

CHEMICAL TOXICOLOGY: Toxic chemicals in the environment – effects of toxic chemicals – cyanide and its toxic effects – pesticides and its biochemical effects – toxicity of lead, mercury, arsenic and cadmium. **AirPollution** Definition – Sources of air pollution – Classification of air pollution – Acid rain – Photochemical smog – Green house effect – Formation and depletion of ozone – Bhopal gas disaster – Controlling methods of air pollution.

2. ENVIRONMENTAL CHEMISTRY - II

WATER POLLUTION: Unique physical and chemical properties of water – water quality and criteria for finding of water quality – Dissolved oxygen – BOD, COD, Suspended solids, total dissolved solids, alkalinity – Hardness of water – Methods to convert temporary hard water into soft water – Methods to convert permanent hard water into soft water – eutrophication and its effects – principal wastage treatment – Industrial waste water treatment.

UNIT – II:

3. A. HALOGEN COMPOUNDS: Nomenclature and classification of alkyl (into primary, secondary, tertiary), aryl, aryl alkyl, allyl, vinyl, benzyl halides. Nucleophilic aliphatic substitution reaction- classification into SN¹ and SN² – reaction mechanism with examples – Ethyl chloride, t-butyl chloride and optically active alkyl halide 2-bromobutane.

B. HYDROXY COMPOUNDS: Nomenclature and classification of hydroxy compounds. Alcohols: Preparation with hydroboration reaction, Grignard synthesis of alcohols. Phenols: Preparation i) from diazonium salt, ii) from aryl sulphonates. Physical properties- Hydrogen bonding (intermolecular and intramolecular). Effect of hydrogen bonding on boiling point and solubility in water. Identification of alcohols by oxidation with KMnO₄, Ceric ammonium nitrate, Luca's reagent and phenols by reaction with FeCl₃. Chemical properties: a) Dehydration of alcohols. b) Oxidation of alcohols by CrO₃, KMnO₄. c) Special reaction of phenols, Bromination, Kolbe-Schmidt reaction, Riemer-Tiemann reaction, Fries rearrangement, azocoupling, Pinacol-Pinacolone rearrangement. 4. CARBONYL COMPOUNDS: 1. Nomenclature of aliphatic and aromatic carbonyl compounds, structure of the carbonyl group. 2. Synthesis of aldehydes from acid Chlorides, synthesis of aldehydes and ketones using 1,3 –dithianes, synthesis of ketones from nitriles and from carboxylic acids. physical properties; reactivity of carbonyl group in aldehydes and ketones. 3. Nucleophilic addition reaction with a) NaHSO₃, b) HCN c) RMgX, d) NH₂OH, e) C₆H₅ NHNH₂ f) 2,4 DNPH g) Alcohols – formation of hemiacetal and acetal h) Halogenation using Pcl₅ 4. Base catalysed reactions: a) Aldol condensation b)Benzoin condensation, c)Cannizzaros reaction d) Haloform reaction, e) Perkins reaction. oxidation of aldehydes – Baeyer – Viliger oxidation of Ketones 5. Reduction: Clemmensen reduction, Wolf- kishner reduction, MPV Reduction, reduction with LiAlH₄, and NaBH₄. Analysis of aldehydes and ketones with a)2,3 – DNPH Test b) Tollen's test c) Fehling test d) Schiff's test e) Haloform test.

UNIT – III:

- 5. CARBOXYLIC ACIDS AND DERIVATIVES: 1. Nomenclature, classification and structure of carboxylic acids. 2. Methods of preparation by a) hydrolysis of nitriles, amides. b) hydrolysis of esters(Mechanism in Acidic and Basic medium) c) Carbonation of Grignard reagents. 3. Special methods of preparation of aromatic acids by a. Oxidation of side chain. b. Hydrolysis by benzo trichlorides. c. Kolbe reaction 4. Physical properties : Hydrogen bonding, dimeric association, acidity strength of acids with examples of trimethyl acetic acid and trichloro acetic acid. Relative differences in the acidities of aromatic and aliphatic acids. 5. Chemical properties : Reactions involving H, OH and COOH groups salt formation, anhydride formation, acid chloride formation, amide formation and esterificaiton (mechanism). Degradation of carboxylic acids by Huns Diecker reaction, decarboxylaiton by Schimdt reation, Arndt Eistert synthesis, halogenation by Hell Volhard Zelinsky reaction.
- 6. ACTIVE METHYLENE COMPOUNDS: Acetoacetic ester: keto-enol tautomerism, preparation by Claisen condensation, Acid hydrolysis and ketonic hydrolysis. Synthetic applications: Preparation of a) monocarboxylic acids. b) Dicarboxylic acids. c) Reaction with urea. Malonic ester: preparation from acetic acid. Synthetic applications: Preparation of a) monocarboxylic acids. b) Dicarboxylic acids (succinic acid and n-butyric acid). b) Dicarboxylic acids (succinic acid and adipic acid) c) α,β-unsaturated carboxylic acids(crotonic acid). d) Reaction with urea.

REFERENCE BOOKS:

- 1. A Text book of Environmental chemistry by W. Moore and F.A. Moore
- 2. Environmental Chemistry by Samir k. Banerji
- 3. Organic Chemistry Robert T.Morrison & Robert B.Boyd Published by Prentice Hall or India Pvt. Ltd., New Delhi 110001.
- Advanced Organic chemistry B.S.Bahl & Arun Bahl S.Chand & Company Ramnagar, New Delhi –110055.
- Organic Chemistry Vol. I The Fundamental Principles I.L.Finar (ELBS) English Language Books Society / Longman – Longman Scientific & Technical, Longman Group UK Ltd., Longman House, Bunt Mill, Harlow, Essex CH 20, 2JE England.
- A Guide book to Mechanism in Organic Chemistry Peter Sykes Longman Group Ltd., London, Divisional Director, Orient Longman Ltd. – Published by V.Abdulla 36A Annasalai, Mount Road, Madras –600002.
- 7. Unified Chemistry Vol.I,II&III Kalyani Publishers 1/1 Rajender Nagar, Ludhiana 141008.
- 8. Organic chemistry by Bruice
- 9. Organic chemistry by Clayden

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAMII SEMESTERCHEMISTRY3 Hrs/WeekCH 2251 (2)QUALITATIVE INORGANIC ANALYSIS – IIMax. Marks: 50w.e.f 2017-2020('17AE')PRACTICAL SYLLABUS – I B

OBJECTIVE: To enable the students to acquire skills necessary for qualitative analysis of salts containing two anions and two cations from two different groups.

Analysis of mixture salt containing two anions and two cations (From two different groups) from the following:

Anions: Sulphate, chloride, bromide, nitrate, acetate, borate, phosphate, tartrate, oxalate.

cations: Lead, copper, cadmium, iron, aluminum, zinc, chromium, manganese, nickel, cobalt, calcium, strontium, barium, potassium, ammonium and Magnesium.

REFERENCE BOOKS:

- Vogel's Test Book of Macro & Semimicro Qualitative Inorganic Analysis V Edition Revised by G.Svehla – Orient Longman Ltd., New Delhi.
- 2. Semimicro Qualitative Analysis V. V. Ramanujam
- 3. Advanced practical Inorganic Chemistry Gurdeep Raj GOEL Publishing House, Meerut, 11th Edition.
- 4. Vogel's Qualitative Inorganic Analysis G.Svehla Pearson Education, VII Edition.

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS) VISAKHAPATNAMIV SEMESTERCHEMISTRYCH 4201 (3)INORGANIC CHEMISTRYw.e.f 2016-2019 ('16AD')SYLLABUS

OBJECTIVES:

- Knowledge of Transition metals & Inner Transition metals, the former having many differences yet grouped together, contrasting with the latter in which separation of the elements is very difficult. Uniqueness in complex formation and very importantly the catalytic ability, which is still a thrust area for research and development. To draw inspiration to synthesize newer elements and stretch the horizon of science.
- 2. A colourful intriguing field of compounds, whose study posed problems for long time and continue to do so in some areas even today, is the Coordination Chemistry. An evergreen field of growth and flourish is the world of coordination compounds. To get attracted and to find the solutions for the complex issues.
- 3. Knowledge of crystals provides a way of approach for the study of any topic of Chemistry one wants to learn or master.

COURSE:

UNIT – I:

1. d –Block Elements: Introduction, position of transition elements and significance of their name. Electronic configuration and anomalies of electronic configuration in all the three series. Variable oxidation states – reason for variability - Stability of various oxidation states- magnetic properties – para, dia & ferro magenetism and classification of transition elements. Complex forming ability of d-block elements and advantages of complex formation. Colour and formation of interstitial compounds – catalytic activity of the elements and their compounds - reasons for the ability of them to catalyze and applications. General properties such as atomic and ionic radii, ionization energy and metallic properties. Comparative treatment of second and third transition series with their 3d analogues i.e. trends in physical and chemical properties in passing from I to the II and to the III series.

2. f – Block Elements :

General discussion, electronic configuration and anomalies in electronic configuration. Ionic size Oxidation states, magnetic properties. Lanthanide contraction – effects of Lanthanide Contraction within the series and on the post lanthanide elements. Rare – earth minerals composition of Cerium group and Yttrium groups in them. Methods of separation of lanthanides Fractional Crystallization, Solvent Extraction, Ion – exchange methods. Chemistry of actinides - electronic configuration, oxidation states, actinide contraction, comparison of lanthanides and actinides.

UNIT – II:

3. COORDINATION COMPOUNDS- I :

Introduction and review of early theories, Werner's theory of complex compounds, Sidgwick's concept of coordination, Electronic interpretation and EAN rule - Nomenclature adopting IUPAC rules. Valence bond theory. Geometries of Coordination numbers 4 – tetrahedral and square planar and 6 – octahedral and limitations of Valence bond theory., crystal filed theory - splitting of d-orbitals in octahedral, tetrahedral and square-planar complexes - low spin and high spin complexes - Crystal Field Stabilization energy.factors affecting crystal-field Stabilization energy, merits and demerits of crystal-field theory.

4. COORDINATION COMPOUNDS - II

Structural isomerism – Polymerization Isomerism, Coordination, Ionisation, Hydrate, Ligand and Linkage Isomerism - Stereo Isomerism – Optical Isomerism of Complexes with Coordination numbers 4 and 6. Geometrical Isomerism of complexes with Coordination numbers 4 and 6. Stability of metal complexes Thermodynamic stability and kinetic stability, factors affecting the stability of metal complexes, chelate effect, determination of composition of complex by Job's method and mole ratio method. Spectral and magnetic properties of metal complexesTypes of magnetic behavior, spin-only formula, calculation of magnetic moments, experimental determination of magnetic susceptibility-Gouymethod.

UNIT – III:

5. REACTIVITY OF METAL COMPLEXES AND BIOINORGANIC CHEMISTRY

Labile and inert complexes, ligand substitution reactions - SN¹ and SN², substitution reactions of square planar complexes - Trans effect and applications of trans effect. Essential elements, biological significance of Na, K, Mg, Ca, Fe, Co, Ni, Cu, Zn and Cl⁻. Metalloporphyrins – Structure and functions of hemoglobin, Myoglobin and Chlorophyll.

6. SOLIDSTATE

Symmetry in crystals. Law of constancy of interfacial angles. The law of rationality of indices. The law of symmetry. Definition of lattice point, space lattice, unit cell. Bravis lattices and crystal systems. X-ray diffraction and crystal structure. Bragg's law. Defects in crystals. Stoichiometric and non-stoichiometric defects.

REFERENCE BOOKS:

- 1. Advanced Inorganic chemistry by Gurudeep Raj
- 2. Concise Inorganic Chemistry by J.D.Lee
- 3. Unified Chemistry (Vol.) (B.Sc. I) Y.R.Sharma & Dr. K.Rama Rao Kalyani Publishers, Ludhjana. Fourth Revised and Enlarged Edition (2013, Reprint)
- 4. Unified Chemistry (Vol.2) (B.Sc. II) Y.R.Sharma & Dr. K.Rama Rao Kalyani Publishers, Ludhjana. Fourth Revised and Enlarged Edition (2013, Reprint)
- 5. Unified Chemistry (Vol.2) (B.Sc. III) Y.R.Sharma & Dr. K.Rama Rao Kalyani Publishers, Ludhjana. Fourth Revised and Enlarged Edition (2013, Reprint)
- 6. Advanced Inorganic Chemistry F.A.Cotton & G.Wilkinson Inter Science Publishers, New York.
- 7. Modern Aspects of Inorganic Chemistry IV Edition H.J.Emeleus & A.G.Sharpe ELBS, Great Britain.
- 8. Inorganic Chemistry 20th Edition P.L.Soni Sultan Chand & Sons, New Delhi.
- 9. Man-made Transuranium Elements Glenn T.Seaborg Prentice Hall, N.J.
- 10. Coordination Compounds D.F.Martin & B.B.Martin McGraw-Hill Book Company, New York.
- 11. Coordination Chemistry F.Basolo & R.Johnson-W.A.Benjamin Inc., California.
- 12. Test Book of Physical Chemistry 2nd Edition S.Glasstone Macmillan & Co.Ltd., London.
- 13. Solid State Chemistry and its applications by Anthony R. West

OBJECTIVE: To enable the students to –

- Conduct experiements designed for volumetric analysis.
- Interpret experimental/investigative data
- Apply theory-based tools to solve simple chemical problems related to subject areas
- Understand the use of conductometers and apply them to estimate the strength of acids.
- 1. Determination of Cu(II) using $Na_2S_2O_3$ with $K_2Cr_2O_7$ as primary standard.
- 2. Determination of concentration of HCI conductometrically using standard NaOH solution.
- Determination of concentration of acetic acid conductometrically using standard NaOH solution.

REFERENCE BOOKS:

- Vogel's Text Book of Quantitative Inorganic Analysis, IV Edition J.Bassett, R.C.Denny, G.H.Jeffery, J.Mendhan ELBS/Longman, England
- Instrumental methods of chemical analysis B.K.Sharma GOEL publishing House, Meerut, 26th Edition.
- 3. Practical Monograph prepared by the Department.

OBJECTIVES: To enable the students to apply physical laws to chemical phenomena To understand principles of electricity, most essential commodity of man, and further it to prosperity. Similarly dry cells are centre of attention and usefulness presently. Correlate characteristic chemical behaviour of metals, organometallic compounds as well as the nature of bonding present in them.

COURSE:

UNIT – I:

1. SOLUTIONS:

Liquid-liquid - ideal solutions, Raoult's law, ideally dilute solutions, Henry's law. Non-ideal solutions. Vapour pressure - composition and vapour pressure - temperature curves. Azeotropes- HCI-H₂O, ethanol-water systems and fractional distillation. Partially miscible liquids- phenol-water, trimethylamine-water, nicotine-water systems. Effect of impurity on consulate temperature. Immiscible liquids and steam distillation. Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

2. COLLIGATIVE PROPERTIES:

Raoult's law, relative lowering of vapour pressure, its relation to molecular weight of non-volatile solute. Elevation of boiling point and depression of freezing point. Derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods of determination. Osmosis, osmotic pressure, experimental determination. Theory of dilute solutions. Determination of molecular weight of non-volatile solute from osmotic pressure. Abnormal Colligative properties- Van't Hoff factor.

UNIT – II

3. ELECTRO CHEMISTRY - I:

Electrical transport- Conductors – electronic conductors and electrolytic conductors Conduction in metals and in electrolyte solutions, Specific conductance, equivalent conductance. Variation of equivalent conductance with dilution. Migration of ions, Kohlrausch's law. Arrhenius theory of electrolyte dissociation and its limitations. Ostwald's dilution law, its uses and limitations. Debye-Huckel-Onsagar's equation for strong electrolytes (elementary treatment only). Definition of transport number, determination by Hittorfs method. Application of conductivity measurements- conductometric titrations. method and explanation of strong acid Vs strong base and mixture of acids (strong and weak) Vs strong base titrations.

4. ELECTRO CHEMISTRY – II:

Electrochemical cell, cell notation, cell reactions, reversible cells, , irreversible cells – differences between electrolytic and electro chemical cells. . Single electrodes: Types of single electrodes like metal-metal ion single electrode, calomel electrode, standard hydrogen electrodes. Construction and working of calomel electrode and normal hydrogen electrode. Standard electrode potentials Single electrode potential,-- Determination of EMF of cell, Nernst equation and calculation of electrode potentials at different concentrations. Applications of EMF measurements - Potentiometric titrations.

UNIT – III:

- 5. A. THEORIES OF BONDING IN METALS: Metallic properties and its limitations, Valence bond theory, Free electron theory, Explanation of thermal and electrical conductivity of metals, limitations, Band theory, formation of bands, explanation of conductors, semiconductors and insulators.
 - **B. METAL CARBONYLS :** EAN rule, classification of metal carbonyls, structures and shapes of metal carbonyls of V, Cr, Mn, Fe, Co and Ni.
- 6. ORGANOMETALLIC COMPOUNDS: Definition classification of Organometallic compounds

 nomenclature, preparation, properties and applications of alkyls of Li and Mg.

REFERENCES:

- 1. Text Book of physical chemistry P.L.Soni and O.P. Dharmarha, 20th Edition, Sultan Chand and Sons, New Delhi.
- Elements of Physical Chemistry B.R. Puri, L.R. Sharma & Madan S. Pathania, 43rd Edition, 2008, Vishal Publishing Co., Jalandhar.
- 3. Essentials of physical chemistry B.S.Bahl and G.D. Tuli, 25th Edition, Sultan Chand and Sons, New Delhi.
- 4. Physical Chemistry, Part II R.K.Prasad, Bharati Bhawan, Patna.
- 5. Unified Chemistry (Vol.2) (B.Sc. I) Y.R.Sharma & Dr. K.Rama Rao Kalyani Publishers, Ludhiana. Sixth Revised Edition, 2010.
- Unified Chemistry (Vol.2) (B.Sc. II) Y.R.Sharma & Dr. K.Rama Rao Kalyani Publishers, Ludhiana. Sixth Revised Edition, 2010.
- Unified Chemistry (Vol.2) (B.Sc. III) Y.R.Sharma & Dr. K.Rama Rao Kalyani Publishers, Ludhiana. Sixth Revised Edition, 2010.
- 8. Basic Inorganic Chemistry by Cotton and Wilkinson
- 9. Concise Inorganic Chemistry by J.D.Lee

OBJECTIVES: To enable the students to apply physical laws to study chemical phenomena.

- 1. Determination of rate constant for acid catalyzed ester hydrolysis.
- 2. Determination of partition coefficient of lodine between organic liquid and water.
- 3. Determination of Surface tension of liquid
- 4. Determination of Viscosity of liquid.
- 5. Demonstration of Adsorption of acetic acid on animal charcoal, verification of Freundlisch isotherm

REFERENCES:

- Senior Practical Physical Chemistry B.D.Khosla, V.C.Garg Adarsh Khosla, R.Chand & Co. Delhi V edition.
- Expts. In Physical Chemistry JC Ghosh Bharati Bhawan (Publishers & Distributers), Patna, II Edition.

OBJECTIVES: To enable the students to -

- 1. To introduce upcoming fields like polymers, which have lot of promise is believed to be the major research field of future.
- 2.know and identify the characterization, classification of polymers and various manufacturing units for plastics, elastomeric materials and fibers with special emphasis on synthetic approach to many polymers.
- UNIT- I: 1. Introduction of polymers: Basic definitions, degree of polymerization ,classification of polymers- Natural, Synthetic polymers and Semisynthetic polymers, Organic and Inorganic polymers, Thermoplastic and Thermosetting polymers, Plastics, Elastomers, Fibers and Resins, Linear ,Branched and Cross Linked polymers.
 - **2. Mechanism of polymerization**: Addition polymers and Condensation Polymers, Free radical, ionic and Zeigler Natta polymerization.
 - **UNIT–II: 3.** Kinetics of Free radical polymerization, Glass Transition temperature (Tg) and Determination of Tg: factors affecting glass transition temperature (Tg).
 - **4. Techniques of Polymerization:** Bulk polymerization, solution polymerization, suspension and Emulsion polymerization. Molecular weights of polymers: Number average and weight average molecular weights Determination of molecular weight of polymers by Viscometry, Osmometry and light scattering methods.
- UNIT–III: 5. Polymer additives: Introduction to plastic additives fillers, Plasticizers and Softeners, Lubricants and Flow Promoters, Anti aging additives, Flame Retardants, Colourants, Blowing agents, Cross linking agents, Photo stabilizers, Nucleating agents.
 - **6. Polymers and their applications**: Preparation and industrial applications of Polyethylene, Polyvinyl chloride, Teflon, Polyacrylonitrile, Terelene, Nylon6.6 silicones. Biodegradable Polymers Examples-importance of biodegradable Polymers.

Reference Books:

- 1. Seymour, R.B. & Carraher, C.E. Polymer Chemistry: An Introduction, Marcel Dekker, Inc. New York, 1981.
- 2. Odian, G. Principles of Polymerization, 4th Ed. Wiley, 2004.
- 3. Billmeyer, F.W. Textbook of Polymer Science, 2nd Ed. Wiley Interscience, 1971.
- 4. Ghosh, P. Polymer Science & Technology, Tata McGraw-Hill Education, 1991.34
- Lenz, R.W. Organic Chemistry of Synthetic High Polymers. Interscience Publishers, NewYork, 1967.

OBJECTIVE: To enable the students to examine water quality through quantitative estimation of selected water quality parameters

- 1. Determination of carbonate and bicarbonate in water samples (acidity and alkalinity)
- 2. Determination of hardness of water using EDTA
 - a) Permanent hardness
 - b) Temporary hardness
- 3. Determination of Acidity
- 4. Determination of Alkalinity
- 5. Determination of chlorides in water samples

REFRENCES:

- 1. Vogel's T.B. of Quantitative Inorganic Analysis J. Besseth R.C.Denney, GH Jeffery & J.Mendham. ELBS IV Edition.
- 2. Standard Methods for the Examination of Water and Waste Water, 19th Edition, APHA, AWWA, WEF 1995.

OBJECTIVES: To enable the students to -

- Apply the synthetic applications for the synthesis of various organic compounds.
- To enable the students to know fundamentals of molecular spectroscopy.
- Acquire the proper knowledge of Spectroscopy.

UNIT – I:

- NITROGEN COMPOUNDS: A.Nitro hydro carbons: Nomenclature and classification of nitro hydrocarbons – structure. Tautomerism of nitro alkanes leading to aci and ketoform. Preparation of nitroalkanes. Reactivity – halogenation, reaction with HONO (Nitrous acid), Nef reaction and Mannich reaction leading to Michael addition and reduction. B. Amines (Aliphatic and Aromatic): Nomenclature, classification into 1^o, 2^o, 3^o Amines and quarternary ammonium compounds. A. Preparative methods – i. Ammonolysis of alkyl halides ii Hoffman's bromamide reaction (mechanism) iii. Reduction of Amides and Schmidt reaction. B. Physical properties and basic character – comparative basic strength of Ammonia, methyl amine, dimethyl amine, trimethyl amine and aniline – comparative basic strength of aniline – N-methyl aniline and N,Ndimethyl aniline (in aqueous and non-aqueous medium), steric effects and substituent effects. Use of amine salts as phase transfer catalysts. C. Chemical properties: Alkylation, Acylation, Carbylamine reaction, Hinsberg separation, Reaction with Nitrous acid of 1^o,2^o,3^o (Aliphatic and aromatic amines), Electrophilic substitutions of Aromatic amines – Bromination and Nitration. Oxidation of aryl and 3^o Amines. Diazotization.
- **2. DIAZONIUM COMPOUNDS:** a. Preparation of Benzene diazonium chloride from Aniline (mechanism). b. Synthetic Applycations of Benzene diazonium chloride i. chloro benzene ii. bromo benzene iii. fluro benzene iv. benzoic acid v. benzene vi. Phenol

UNIT – II:

- 3. HETEROCYCLIC COMPOUNDS: Introduction and definition, classification five membered Heterocyclic compounds-pyrrole, Furan, Thiophene- Aromatic character Preparation from 1,4,- dicarbonyl compounds, Paul-Knorr synthesis. Pyrrole: Acidic character, electrophillic substitution at 2 or 5 position, Halogenation, Nitration and Sulphonation under mild conditions, friedel crafts acylation. Diels Alder reaction in furan. Pyridine: Preparation by Dehydrogenation of piperidine, Structure, Basicity Aromaticity Comparison with benzene and pyrrole and electrophillic substitution reactions Nitration, Sulphonation, Halogenation. Reactivity towards Nucleophilic substitution reactions.
- 4. CARBOHYDRATES: Introduction, 1. Definition, 2.Classification 3. Monosaccharides: Glucose (aldo hexose) –preparation-Chemical properties Acetylation, cyanohydrin formation, oxidation, Reduction, NH₂OH, osazone formation. Structure of glucose Objections to open chain Structure.Evidence for cyclic structure of glucose (negative aldehydes tests and mutarotation) Proof for the ring size (methylation, hydrolysis and oxidation reactions) Pyranose structure (Haworth formula and chair conformational formula). 4. Fructose (ketohexose) preparation, Chemical properties Acetylation, cyanohydrin formation, oxidation, Reduction, NH₂OH, osazone formation. Structure of fructose Definition of anomers with examples. 5. Interconversion of Monosaccharides: (a) Killiani's synthesis- Aldopentose to Aldohexose (Arabinose to D- Glucose, D-Mannose) Epimers, Epimerisation Lobry de bruyn van Ekenstein rearrangement. (b) Ruff degradation- Aldohexose to Aldopentose (D-Glucose to D- Arabinose). (c) Aldohexose to Ketohexose (Glucose to Fructose) d) Ketohexose to Aldohexose (Fructose to Glucose)

UNIT – III:

- 5. MOLECULAR SPECTROSCOPY: Introduction Electronic spectroscopy: Interaction of electromagnetic radiation with molecules and types of molecular spectra. Energy levels of molecular orbitals (σ, π, n). Selection rules for electronic spectra. Types of electronic transitions in molecules effect of conjugation. Concept of chromophore and auxochrome. Infra red spectroscopy: Different Regions in Infrared radiations. Modes of vibrations in diatomic and polyatomic molecules. Characteristic absorption bands of various functional groups. Interpretation of spectra-Alkanes, Aromatic, Alcohols carbonyls, and amines with one example to each.
- 6. PROTON MAGNETIC RESONANCE SPECTROSCOPY (H-NMR) Principles of nuclear magnetic resonance; equivalent and non-equivalent protons; position of signals ; Chemical shift; NMR splitting of signals-spin-spin coupling, coupling constants. Applications of NMR with suitable examples-ethyl bromide, ethanol, acetaldehyde, 1, 1, 2 –tri-bromo ethane, ethyl acetate, toluene and Acetophenone.

REFERENCES:

- 1. Advanced Organic Chemistry B.S.Bahl & Arun Bahl XVIII Edn.-S.Chand & Company, New Delhi – 110055.2006
- Organic Chemistry Robert T.Morrison & Robert N.Boyd V Edn. Prentice-Hall of India Pvt. Ltd., New Delhi – 110001. 1989
- Organic Chemistry (Vol.1 &2) Stereochemistry and the Chemistry of Natural Products I.L.Finar – V & VI Edn – (ELBS) English Language Book Society / Longman, Longman Scientific & Technical , Longman Group UK Ltd., England . 2003
- 4. Organic Spectroscopy William Kemp II Edn The Macmillan Education Ltd., Hamshire. 1978
- 5. Unified Chemistry (Vol. II) IV Edn. Kalyani Publishers, Ludhiana 141008. 2005
- 6. Unified Chemistry (Vol. III) III Edn. Kalyani Publishers, Ludhiana 141008. 2003.
- 7. Spectroscopy by William Kemp
- 8. Spectroscopy by Pavia
- 9. Organic Spectroscopy by J. R. Dyer

OBJECTIVE: To enable the students to identify organic compounds through application of systematic qualitative procedure for functional group identification

Analysis of an organic compound through systematic qualitative procedure for functional group identification including the determination of melting point and boiling point with suitable derivatives.

Alcohols, Phenols, Aldehydes, Ketones, Carboxylic acids, Aromatic Primary Amines, Amides and Simple sugars, alkyl aryl halides.

REFERENCES:

- 1. Practical Organic Chemistry G Mann & B.C.Saunders ELBS & Long man Group Ltd IV Edition.
- Vogels's T.B. of Practical Organic Chemistry B S Furnis A J Hannaford, PWG Smith & AR Tatchell – ELBS V Edition.

ST. JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS) VISAKHAPATNAMVI SEMESTERCHEMISTRYCH-E1-6201 (3)SOME SPECIAL ASPECTS OF CHEMISTRYW.e.f. 2015 – 2018 ('15AC' 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.

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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:

- 'Stereochemistry and Mechanism through Solved Problems' P.S.Kalsi, III Edn. Wiley Eastern Limited, New Delhi 1995
- 'Unified Chemistry' Y.R. Sharma and R. Rama Rao, Part-II, Andhra Edition Kalyani Publishers, New Delhi 2003
- Organic Chemistry Robert T. Morrison and Robert N. Boyd, VI Edition Prentice Hall of India Pvt. Ltd., New Delhi 1989
- Text Book of Physical Chemistry P.L. Soni and O.P. Dharmarha, XXEdn, Sultan Chand & Sons, New Delhi 1994
- 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.
- 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

OBJECTIVES: To enable the students to apply physical laws to study chemical phenomena.

- 1. Determination of rate constant for acid catalyzed ester hydrolysis.
- 2. Determination of partition coefficient of lodine between organic liquid and water.
- 3. Determination of surface tension of liquid.
- 4. Determination of Viscosity of liquid.
- 5. Demonstration of Adsorption of acetic acid on animal charcoal, verification of Freundlishc isotherm.

REFERENCES:

- Senior practical physical Chemistry B.D.Khosla, V.C.Garg Adarsh Khosla, R.Chand &Co.Delhi V edition.
- Expts. In Physical Chemistry JC Ghosh Bharati Bhawan (Publishers& Distributers), Patna, II Edition.

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM VI SEMESTER CHEMISTRY Time: 3 Hrs/ Week CH-A1-6201 (3) PHARMACEUTICAL AND MEDICINAL CHEMISTRY Max.Marks:100 w.e.f 2015 – 2018 ('15AC' Batch) SYLLABUS

OBJECTIVES: To enable the students to gain knowledge

- 1. By understanding the terminology of pharmaceutical chemistry
- 2. Understand the fundamental aspects of synthetic drugs its morphology, physiological activity of some important drugs.
- 3. About the importance of Pharmacodynamic, HIV-AIDS drugs.
- UNIT I : 1. Pharmaceutical chemistry: Terminology, Pharmacy, Pharmacology, Pharmacophore, Pharmacodynamics, Pharmacokinetics (ADME,Receptors - brief treatment) Metabolites and Anti metabolites.
 - Drugs: Nomenclature, Chemical name, Generic name and trade names with examples Classification: Classification based on structures and therapeutic activity with one example each, Administration of drugs
- UNIT– II: 3. Chemotherapeutic Drugs: Synthesis and therapeutic activity of the compounds Sulphadrugs (Sulphanilamide only) 2.Antibiotics - β-Lactam Antibiotics (penicillin G.only) Macrolide Antibiotics, 3. Anti malarial Drugs (chloroquine only)
 - 4. CNS Drugs: Definition-classification-Examples- Psycho therapeutic Drugs:
 - 1. Antipyretics: Synthesis and therapeutic action of Paracetamol and structures of Hypnotics, Tranquilizers (Diazepam only) Levodopa
- **UNIT–III: 5. Pharmacodynamic Drugs:** 1. Antiasthma Drugs (Solbutamol only) 3. Antianginals (Glycerol Trinitrate only) 4. Diuretics (Frusemide only)
 - 6. HIV AIDS: Immunity CD 4cells, CD-8cells, Retro virus, Replication in human body, Investigation available, prevention of AIDS, Drugs available examples with structures: PIS: Indivanir (crixivan), Nelfinavir(Viracept).

List of Reference Books:

- 1. Medicinal Chemistry by Dr. B.V.Ramana
- 2. Synthetic Drugs by O.D.Tyagi & M.Yadav
- 3. Medicinal Chemistry by Ashutoshkar
- 4. Medicinal Chemistry by P.Parimoo
- 5. Pharmacology& Pharmacotherapeutics R.S Satoshkar & S.D.Bhandenkar
- 6. Medicinal Chemistry by Kadametal P-I & P-II
- 7. European Pharmacopoeia

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAMVI SEMESTERCHEMISTRYCH-A1-6251 (2)VOLUMETRIC ANALYSIS - IIw.e.f.(15AC&16AD Batch only)PRACTICAL SYLLABUS – IV A1

OBJECTIVES: To enable the students to -

- Conduct experiments designed for volumetric analysis
- Interpret experimental/investigative data
- Apply theory-based tools to solve simple chemical problems related to subject areas
- Understand the use of conductometers and apply them to estimate the strength of acids
 - 1. Determination of Cu(II) using $Na_2S_2O_3$ with $K_2Cr_2O_7$ as primary standard.
 - 2. Determination of concentration of HCI conductometrically using standard NaOH solution.
 - 3. Determination of concentration of acetic acid conductometrically using standard NaOH Solution.

REFERENCES:

- Vogel's Text Book of Quantitative Inorganic Analysis, IV Edition J.Bassett, R.C.Denny, G.H.Jeffery, J.Mendhan ELBS/Longman, England
- Instrumental methods of chemical analysis B.K.Sharma GOEL Publishing House, Meerut, 26th Edition.
- 3. Practical Monograph prepared by the Department.

OBJECTIVES: To enable the students to –

- 1. To gain knowledge and to help in facing biggest challenges of 21st century by studying Green strategies enhance the environmental quality. To emphasize the basic green chemistry principles & green reactions.
- 2. A critical insight into green methods adopting green catalysts and green solvents
- **3.** Alternative methods Microwave and Ultrasound conditions for some popular named reactions
- UNIT I: 1. Green Chemistry: Introduction- Definition of green Chemistry, need of green chemistry, basic principles of green chemistry. Green synthesis- Evalution of the type of the reaction i) Rearrangements (100% atom economic), ii) Addition reaction (100% atom economic). Organic reactions by Sonication method: apparatus required examples of sonochemical reactions (Heck, Hundsdiecker and Wittig reactions).
 - Selection of solvent: i) Aqueous phase reactions ii) Reactions in ionic liquids, Heckreaction, Suzuki reactions, epoxidation. iii) Solid supported synthesis. Super critical CO₂: Preparation, properties and applications, (decaffeination, dry cleaning)
- UNIT- II : 3. Microwave and Ultrasound assisted green synthesis: Apparatus required, examples of MAOS (synthesis of fused anthro quinones, Leukart reductive amination of ketones)
 Advantages and disadvantages of MAOS. Aldol condensation-Cannizzaro reaction-Diels-Alder reactions-Strecker's synthesis
 - **4. Green catalysis:** Heterogeneous catalysis, use of zeolites, silica, alumina, supported catalysis-biocatalysis: Enzymes, microbes Phase transfer catalysis (micellar/surfactant) Crown Ethers
- UNIT- III: 5. Examples of green synthesis / reactions and some real world cases: 1. Green synthesis of the following compounds: adipic acid , catechol , disodium imino di acetate (alternative Strecker's synthesis) 2. Microwave assisted reaction in water Hoffmann elimination methyl benzoate to benzoic acid oxidation of toluene and alcohols.
 - **6. Microwave assisted reactions in organic solvents.** Diels-Alder reactions and decarboxylation reaction. 3. Ultrasound assisted reactions sonochemical Simmons Smith reaction(ultrasonic alternative to iodine)

REFERENCE BOOKS:

- 1. Green Chemistry Theory and Practice. P.T.Anatas and J.C. Warner
- 2. Green Chemistry V.K. Ahluwalia Narosa, New Delhi.
- 3. Real world cases in Green Chemistry M.C. Cann and M.E. Connelly
- 4. Green Chemistry: Introductory Text M.Lancaster: Royal Society of Chemistry (London)
- 5. Green Chemistry: Introductory Text, M.Lancaster
 - 6. Green Chemistry: Environmental friendly alternatives R S Sanghli and M.M Srivastava, Narosa Publications

ST. JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS) VISAKHAPATNAMVI SEMESTERCHEMISTRYCH-A2-6251(2)REACTIONS WITH GREEN PROCEDURESMax. Marks: 50w. e. f 2015-2018 ('15AC' Batch)PRACTICAL SYLLABUS – IV A2

OBJECTIVE: To enable the students to apply the principles of green chemistry for the analysis and synthesis of organic compounds with emphasis on yield.

- 1. Green procedure for organic qualitative analysis: Detection of N, S and halogens
- 2. Acetylation of 1^o amine by green method: Preparation of acetanilide
- 3. Rearrangement reaction in green conditions: Benzil-Benzilic acid rearrangement
- 4. Electrophilic aromatic substitution reaction: Nitration of phenol
- 5. Radical coupling reaction: Preparation of 1,1-bis -2-naphthol
- 6. Green oxidation reaction: Synthesis of adipic acid
- 7. Green procedure for Diels Alder reaction between furan and maleic anhydride

REFERENCES :

- 1. Green Chemistry Theory and Practice. P Anatas and J C Warner. Oxford Science Publications, 1998.
 - 2. Monograph on Green Chemistry Laboratory Experiments. Green Chemistry Task Force Committee, DST,