A.G. & S.G. Siddhartha Degree College of Arts &Science, Vuyyuru – 521165.
(An Autonomous College in the jurisdiction of Krishna University)

DEPARTMENT OF CHEMISTRY (P.G)

Board of Studies for the academic Year 2024-25 (Odd Semesters)

1. **Agenda**

   Discussion on semester I and III syllabus in bos meeting **Proposed agenda** for Board of studies in **Chemistry** on through online mode.

1. Approval of programme structure for the batch of students admitted in the year 2023-2024 onwards and if required necessary modifications can be made in the course titles of III & IV semester in later course.
2. Approval of syllabus for I semester for the batch of students admitted in the year 2024 – 2025 without revesion and Semester III syllabus witout any revision for the students admitted in the year 2023-2024.
3. Approval of the syllabus of semester – I & III with course out comes drafted inline with levels of blooms taxonomy.
4. Approval of unmodified model question papers for I semester & modified model question papers for III semester inline with Bloom's taxonomy.
5. Approval of MOOCS exam to be conducted by the examination Section.
   The students of admitted batch 2023-2024 are supposed to clear MOOCS paper in online mode and for those who fail to complete the course online, examination section of the college will conduct the exam with same syallbus prescribed by NPTEL.
6. Any other with the permission of the chairman.

Members Present:-

S.No	**Members**	**Designation**	**Signature**
1	**Dr.V.N.V.Kishore** Head, I/C Dept. of Chemistry(P.G) AG & SG S College, Vuyyuru	Chairman	
3	**Dr. D. Rama Sekhara Reddy** Department of Chemistry Krishna University,Machilipatnam	University Nominee	
4	**Prof. Koya Prabakar Rao** Department of Chemistry Vignan University, Guntur.	Subject Expert	
5	**Dr.A.V.D Nagendra Kumar** Associate professor Dept. of Chemistry Githam University	Subject Expert	
6	**Dr.G.Raja** Manager(Q.A) Biophore India pharamaceuticals. Hyderbad.	Representative from Industry	
7	**Ms.Nafesunnisa**	One Post Graduate Meritorious Aluminous nominated by the Principal	
8	**N.V.Srinivasa Rao** Department of Mathematics AG & SG S College, Vuyyuru.	Representative Science Faculty Other Dept .	
9	**Dr.M Sivanath** Dept. of Chemistry AG & SG S College, Vuyyuru	Member	
10	**Dr.Giri Prasad** Dept. of Chemistry AG & SG S College, Vuyyuru	Member	
11	**Smt. Dilshad Begum** Dept. of Chemistry(P.G) AG & SG S College, Vuyyuru	Member	
12	**Smt. M.Rekha** Dept. of Chemistry(P.G) AG & SG S College, Vuyyuru	Member	

Resolutions/ Recommendations

Resolution –I

It is resolved and recommended to implement the course structure as per R 22 regulations of KRU with necessary modifications as required.

Resolution –I

It is resolved to implement the existing syllabus for both theory and practicals with no revision for Semester-III students admitted in the year 2023-2024

Resolution –III

It is resolved to continue with introduced six domain specific elective courses without any change.

They are Organic reaction and mechanism, organic synthesis, natural products, Separation techniques, Marine Chemistry or Chemistry of drugs, Antibiotics, Drugs, vitamins & Steriod hormones.

It is resolved and recommended to change the course code of organic reaction and mechanism as 223CHE1

It is resolved and recommended to change the course code of organic Synthesis as 223CHE2

It is resolved and recommended to change the course code of Natural products as 223CHE3

Semester -I

Course Code	Course Name	Teaching Hours/ week			CORE / IDC/DSE/ SEC/OEC/ MOOCS	Internal Marks	External Marks	No. of Credits
		Lecture	Practical	Tutorial				
22CH1T1	General Chemistry	4	0	0	Core	30	70	4
22CH1T2	Inorganic Chemistry	4	0	0	Core	30	70	4
22CH1T3	Organic Chemistry	4	0	0	Core	30	70	4
22CH1T4	Physical Chemistry	4	0	0	Core	30	70	4
COMPULSORY 22PG101	**Personality Development through Life Enlightenment Skills**	3	1	0	Core	30	70	3
22CH1L1	Inorganic chemistry Practical	0	6	0	Core	30	70	3
22CH1L2	Organic chemistry Practical -I	0	6	0	Core	30	70	3
TOTAL FOR FIRST SEMESTER						**210**	**490**	**25**

III SEMESTER

Course Code	Course Name	Teaching Hours/ week			CORE / IDC/DSE / SEC/OEC/MOOCS	Internal Marks	External Marks	No. of Credits
		Lecture	Practical	Tutorial				
22CH3T1	Organic Spectroscopy	4	0	0	Core	30	70	4
DOMAIN SPE22CH3E1CIFIC ELECTIVE COURSES (CHOOSE ANY THREE)								
22CH3E1	Organic Reaction mechanism	4	0	0	DSE	30	70	4
22CH3E2	Organic Synthesis	4	0	0	DSE	30	70	4
22CH3E3	Natural Products	4	0	0	DSE	30	70	4
22CH3E4	Separation Techniques & Electro analytical techniques	4	0	0	DSE	30	70	4
22CH3E5	Marine Chemistry or Chemistry of Drugs	4	0	0	DSE	30	70	4
22CH3E6	Antibiotics, Drugs, Vitamins & Steroid harmones	4	0	0	DSE	30	70	4
LAB PRACTICALS								
22CH3L1	Organic Preparations	0	6	0	Core	30	70	3
22CH3L2	Organic Binary mixture Analysis.	0	6	0	Core	30	70	3
OPEN ELECTIVE (INTERDISCIPLINARY/MULTIDISCIPLINARY) COURSES (CHOOSE ANY ONE)								
22OE301	Polymer Chemistry	3	0	0	OEC	30	70	3
22OE302	Basic Bio Chemistry	3	0	0	OEC	30	70	3
22OE303	Basic Analytical Chemistry	3	0	0	OEC	30	70	3
		3	0	0	OEC	30	70	3
		3	0	0	OEC	30	70	3
TOTAL FOR III SEMESTER						**210**	**490**	**25**

A.G & S.G.SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

I SEMESTER

W.E.F 2022-23 (R22 Regulations)

Title of the Paper: GENERAL CHEMISTRY

Course Code	22CH1T1	Course Delivery Method	Class Room / Blended Mode -
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2017- 18	Year of Offering: 2022 – 23	Year of Revision: 2022-23	Percentage of Revision: 40 %

S.No	COURSE OUTCOMES	PO`S
	After completion of the course, the student will be able to :	
1	Recollect the concepts of titrimetric analysis, statistical rules, visible spectro photmetry and group theory in chemistry	2
2	Identify the role of titrimetric analysis, statistical rules, visible spectro photmetry and group theory in chemistry.	1,7
3	Demonstrate knowledge of titrimetric analysis, statistical data analysis, visible spectro photometry and group theory in chosen job role.	1,4
4	Test the conceptual knowledge gained in titrimetric analysis, statistical rules / principles, visible spectrosphotometry and group theory in chemistry.	1,6

Syllabus

Course Details:-

Unit	Learning Units	Lecture Hours
I	**Treatment of analytical data** : Classification of errors – Determinate and indeterminate errors –Minimisation of errors – Accuracy and precision – Distribution of random errors – Gaussian distribution – Measures of central tendency – Measures of precision – Standard deviation – Standard error of mean – student's t test – Confidence interval of mean – Testing for significance – Comparison of two means – F – test – Criteria of rejection of an observation – propagation of errors – Significant figures and computation rules – Control charts – Regression analysis – Linear least squares analysis.	12
II	**Titrimetric Analysis:**Classification of reactions in titrimetric analysis- Primary and secondary standards-Neutralisation titrations-Theory of Neutralization indicators-Mixed indicators-Neutralisation curves-Displacement titrations-Precipitation	12

	titrations-Indicators for precipitation titrations-Volhard method-Mohr method- Theory of adsorption indicators-Oxidation reduction titrations-Change of electrode potentials during titration of Fe(II) with Ce(IV)- Detection of end point in redox titrations-Complexometric titrations- Metal ion indicators-Applications of EDTA titrations-Titration of cyanide with silver ion.	
III	**Visible spectro photometry** – Theory of spectrophotometry and colorimetry, Beer-Lambert's law - Deviations from Beers law. Classification of methods of colour measurement or comparison (standard series method, Duplication method, Dilution method, photoelectric-photometer method, spectrophotometer method)-Instrumentation – Applications-determination of phosphates, chlorides, Iron, Manganese, chromium - Photometric titrations-Spectrophotometric determination of pK value of an indicator.	12
IV	**Symmetry and Group theory in Chemistry I** Symmetry elements [Rotational axis of symmetry (C n), Plane of Symmetry(σ) amd Classification of planes of symmetry i.e., Vertical plane(σ v) Dihedral Plane(σ d) and Horizontal Plane(σ h), Improper rotational axis of symmetry(S n), Inversion centre or Centre of symmetry(i) and Identity element(E)]. Identification of possible symmetry elements in the molecules H_2O, NH_3 , BF_3 , CH_4 ,$[PtCl_4]^{-2}$, C_6H_6 , symmetry operation, Axioms of group theory- definition of group, sub group(Trivial and non-trivial sub groups), GMT tables- construction of GMT table Abelian (C_{2v}) and non abelian groups(C_{3v}), relation between order of a finite group and its sub group. Point symmetry group. Schoenflies symbols, Group generating elements, Classification of molecules- MLS, MHS,& amp; MSS. Procedure to Find out Point group of a molecule (yes or no Method),	12
V	**Symmetry and Group theory in Chemistry II** Representation of groups by Matrices (representation for the Cn, C_nv, C_nh, Dn etc. groups to be worked out explicitly). Definition of Class and importance of similarity transformation in identifying symmetry class with c_3v as example, Character of a representation. Reducible and Irreducible representations - Mulliken notations for Irreducible representations The great orthogonality theorem (without proof) and its importance. Character tables and their use. Construction of Character table (C_{2v} and C_{3v} only). Application of group theory in IR and Raman spectroscopy taking H_2O, NH_3, BF_3 examples. Mutual Exclusion principle with special reference to cis N_2F_2 and trans N_2F_2.	12

Reference Books:

1. Vogel's text book of quantitative analysis. (3rd edition)Addition Wesley Longmann Inc.
2. Quantitative analysis R.A Day and A.L.Underwood. Prentice Hall Pvt.Ltd.
3. Fundamentals of Analytical Chemistry – Skoog and West
4. Instrumental Methods of analysis – B K Sharma.

Course Focus: Employability

A.G & S.G.SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

I SEMESTER

W.E.F 2022-23 (R22 Regulations)

Title of the Paper: INORGANIC CHEMISTRY

Course Code	22CH1T2	Course Delivery Method	Class Room / Blended
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2017-18	Year of Offering: 2022 - 23	Year of Revision: ----	Percentage of Revision: 0%

S.No	COURSE OUTCOMES	PO`S
	After completion of the course, the student will be able to :	
1	Memorize the basic concepts of quantum chemistry, co-ordination chemistry and chemical Bonding.	2
2	Comprehend the role of basic and advanced concepts of quantum chemistry, co-ordination chemistry and chemical bonding.	1,7
3	Execute the conceptual knowledge gained in the concepts of quantum chemistry, co-ordination chemistry and chemical bonding in chosen job role**.**	1,4
4	Investigate the role and importance of concepts of quantum chemistry, co-ordination chemistry and chemical bonding in various allied fields of chemistry.	1,7

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	**Introduction to Exact Quantum Mechanical Results:** Schrodinger equation, importance of wave function, Operators, Eigen values and Eigen functions, derivation of wave equation using operator concept. Discussion of solutions of Schrodinger's equation to some model systems viz. particle in one dimensional box (applications), three-dimensional box, Rigid rotator system and the Hydrogen atom. Variation theorem, linear variation principle, perturbation theory (first order and non-degenerate), Application of variation method to the Hydrogen atom.	12
II	**Chemistry of non- transition elements:** Halogen oxides and oxy fluorides, Spectral and Magnetic properties of Lanthanides and Actinides. Analytical applications of Lanthanides and Actinides. Synthesis, properties and structure of B-N, S-N, P-N cyclic compounds. Intercalation compounds. **Metal π- complexes:** preparation, structure and bonding in Nitrosyl, Dinitrogen and Dioxygen complexes.	12
III	**Structure and Bonding:** pπ-dπ bonding, Bent's rule, Non-valence cohesive forces, VSEPR theory. Molecular Orbital theory, Molecular orbitals in triatomic (BeH_2) molecules and ions (NO_2^-) and energy level diagrams. Walsh diagrams for linear (BeH_2) and bent (H_2O) molecules.	12

IV	**Metal–ligand bonding:** Crystal Field Theory of bonding in transition metal complexes-Splitting of d-orbitals in octahedral, tetrahedral, square planar, Trigonal bipyramidal and Square pyramidal fields. Tetragonal distortions - Jahn-Teller effect. Applications and limitations of CFT. Experimental evidences for covalence in complexes. Molecular Orbital Theory of bonding for Octahedral, tetrahedral and square planar complexes. π-bonding and MOT - Effect of π - donor and π -acceptor ligands on Δo. Experimental evidence for π - bonding in complexes.	12
V	**Metal – ligand Equilibria in solutions:** Step wise and over all formation constants. Trends in stepwise formation constants (statistical effect and statistical ratio). Determination of formation constants by Spectrophotometric method (Job's method) and pH metric method (Bjerrum's). Stability correlations - Irwing -William's series. Hard and soft acids and bases (HSAB).	12

Reference Books:

1. Inorganic Chemistry Huheey, Harper and Row.
2. Physical methods in inorganic chemistry, R.S. Drago. Affliated East-West Pvt. Ltd.
3. Concise inorganic chemistry, J. D. Lee, ELBS.
4. Modern Inorganic Chemistry, W. L. Jolly, McGrawHill.
5. Inorganic Chemistry , K. F. Purcell and J. C. Kotz Holt Saunders international.
6. Concepts and methods of inorganic chemistry, B. E. Douglas and D.H.M.C.
7. Daniel, oxford Press.
8. Introductory quantum mechanics , A. K. Chandra
9. Quantum Chemistry, R. K. Prasad.
10. Inorganic Chemistry ,Atkins, ELBS
11. Advanced Inorganic Chemistry ,Cotton and Wilkinson, Wiley Eastern
12. Quantum Chemistry, Levine.
13. Text book of Coordination chemistry ,K.SomaSekhar rao and K.N.K. Vani, Kalyani Publishers.
14. Theoretical Inorganic Chemistry by G.S.Manku, Tata Mc GrawHill, 2000, reprint.
15. Concise co-ordination chemistry, R.Gopal, Ramalingam, Vikas Publishing, House, 2014.
16. Inorganic Chemistry – Huheey, A.Keiter, L.Keiter, 4th edition, Pearson education, Asia.

Course Focus: Employability.

A.G & S.G.SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

I SEMESTER

W.E.F 2022-23 (R22 Regulations)

Title of the Paper: INTRODUCTORY ORGANIC CHEMISTRY

Course Code	22CH1T3	Course Delivery Method	Class Room / Blended Mode -
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2017-18	Year of Offering: 2022 - 23	Year of Revision: -----	Percentage of Revision: 0%

S.No	COURSE OUTCOMES	PO`S
	After completion of the course, the student will be able to :	
1	Recollect the basic concepts of aromaticity, reactive intermediates, addition, elimination and Substitution reactions.	2
2	Explain the basic and advanced concepts of aromaticity, reactive intermediates, addition, elimination and substitution reactions.	2,7
3	Solve high level concepts in organic chemistry with conceptual knowledge gained in aromaticity, reactive intermediates, addition, elimination and substitution reactions.	1,7
4	Exercise the knowledge about aromaticity, reactive intermediates, addition, elimination and substitution reactions in understanding the properties of organic compounds.	1,5

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	**Nature of bonding:** Localised and Delocalized, Delocalised chemical bonding conjugation, cross conjugation, hyper conjugation, Tautomerism. **Aromaticity**: Concept of Aromaticity, Aromaticity of five membered, six membered rings - Non benzonoid aromatic compounds:- cyclopropenylcation, Cyclobutadienyldication, cyclopentadienyl anion-tropyllium cation and cyclooctatetraenyl dianion. Homoaromaticity, Anti aromaticity	12
II	**Reactive intermediates & Reactive Species:** **Reactive intermediates:**Generation, Structure, Stability, Detection and Reactivity of Carbocations, Carbanions, Free radicals, Carbenes, Nitrenes and Arynes. **Reactive Species:** Generation and reactivity of Electrophiles, Nucleophiles, Dienophiles, Ylids.	12

III	**Addition Reactions:** Additions: Addition to carbon – carbon multiple bonds, HX, X2, HOX, stereo chemistry of addition, formation and reaction of epoxides, syn and anti hydroxylation, hydrogenation(catalytic and Non catalytic), synthetic reactions of CO and CN and Cram's rule.	12
IV	**Eliminations Reactions**:Types of elimination (E1, E1cB, E2) reactions, mechanisms, stereochemistry and orientation, Hofmann and Saytzeff's rules, Syn elimination versus anti elimination. Competitions between elimination and substitution.Dehydration, dehydrogenation, dehalogenation, decarboxylative elimination, pyrolytic eliminations.	12
V	**Substitution Reactions:** **Aliphatic Nucleophilic substitutions:** The SN^2, SN^1, mixed SN^1 and SN^2 and SN^i reactions : Mechanism, effect of structure, nucleophile, leaving group on substitutions. The neighbouring group mechanism, participation by σ and π bonds, anchimeric assistance. **Aromatic Nucleophilic substitution:** The SN^{Ar} (Addition – Elimination), SN^1(Ar) mechanisms and benzyne mechanism (Elimination – Addition). Reactivity- effect of substrate structure, leaving group and attacking nucleophile. The Von-Richter, Sommelet – Hauser and Smiles rearrangements.	12

Reference Books:

1. Advanced organic chemistry- Reaction, mechanism and structure, Jerry March, John Wiley.
2. Advanced organic chemistry, F.A. Carey and R.J. Sundberg, Springer, New York.
3. A guide book to Mechanism in organic chemistry, Peter Sykes, Longman.
4. Organic chemistry, I.L. Finar, Vol. I & II, Fifth ed. ELBS.
5. Organic chemistry, Hendrickson, Cram and Hammond (McGraw – Hill).
6. Modern organic Reactions, H.O. House, Benjamin.
7. Structure and mechanism in organic chemistry, C.K. Ingold, Cornell University Press.
8. Principles of organic synthesis, R.O.C. Norman and J.M. Coxon, Blakie Academic & Professional.
9. Reaction Mechanism in Organic Chemistry, S.M. Mukherji and S.P. Singh, Macmillan.
10. Basic Principles of Organic Chemistry by J. B. Roberts and M. Caserio.

Course Focus: Employability & **E**ntrepreneurship.

A.G & S.G.SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

I SEMESTER

W.E.F 2022-23 (R22 Regulations)

Title of the Paper: PHYSICAL CHEMISTRY

Course Code	22CH1T4	Course Delivery Method	Class Room / Blended Mode - Both
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture	60	Total Marks	100
Year of Introduction:2017-2018	Year of Offering: 2022 - 23	Year of Revision:----	Percentage of Revision: 0 %

S.No	COURSE OUTCOMES	PO`S
	After the completion of the course, Students will be able to	
1	Recall the basic concepts of thermodynamics, surface chemistry, electrochemistry, chemical Kinetics and potentiometry in detail.	2
2	Apply the spontaneous and non spontaneous reaction and derive various thermodynamic and Chemical kinetic derivations.	1,7
3	Describe the physical significance of thermodynamics, chemical kinetics and electrochemistry in Explaining the chemical properties and reactivity of molecules.	1,6
4	Analyse the important techniques of surfaces with the help of ESCA, Auger electron spectroscopy and potentiometric techniques of complexometric, neutralization, oxidation and reduction Titrations.	1,7

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	**Thermodynamics – I** Classical thermodynamics - Brief review of first and second laws of thermodynamics - Entropy change in reversible and irreversible processes - Entropy of mixing of ideal gases - Entropy and disorder – Free energy functions - Gibbs-Helmholtz equation - Maxwell partial relations - Conditions of equilibrium and spontaneity - Free energy changes in chemical reactions: Van't Hoff reaction isotherm - Van't Hoff equation - Clausius Clapeyron equation - partial molar quantities - Chemical potential - Gibbs- Duhem equation - partial molar volume - determination of partial molar quantities - Fugacity - Determination of fugacity - Thermodynamic derivation of Raoult's law.	12
II	**Surface phenomena and phase equilibria** - Surface tension - capillary action - pressure difference - across curved surface (young - Laplace equation) - Vapour pressure of small droplets (Kelvin equation) - Gibbs-Adsorption equation - BET equation - Estimation of surface area - catalytic activity of surfaces – ESCA , X- ray fluorescence and Auger electron spectroscopy. **Surface active agents** - classification of surface active agents - Micellization - critical Micelle concentration (CMC) - factors affecting the CMC of surfactants, microemulsions - reverse micelles - Hydrophobic interaction.	12

III	**Electrochemistry – I -** Electrochemical cells - Measurement of EMF - Nernst equation – Equilibrium constant from EMF Data - pH and EMF data - concentration cells with and without transference – Liquid junction potential and its determination - Activity and activity coefficients - Determination by EMF Method - Determination of solubility product from EMF measurements. Debye Huckel limiting law and its verification. Effect of dilution on equivalent conductance of electrolytes - Anomalous behaviour of strong electrolytes. Debye Huckel-Onsagar equation - verification and limitations, conductometric titrations.	12
IV	**Chemical kinetics**- Methods of deriving rate laws - complex reactions - Rate expressions for opposing, parallel and consecutive reactions involving unimolecular steps. Theories of reaction rates - collision theory - Steric factor - Activated complex theory - Thermodynamic aspects – Unimolecular reactions - Lindemann's theory - Lindemann-Hinshelwood theory. Reactions in solutions - Influence of solvent - Primary and secondary salt effects - Elementary account of linear free energy relationships - Hammet - Taft equation - Chain reactions - Rate laws of H_2-Br_2, photochemical reaction of H_2 - Cl_2, Decomposition of acetaldehyde and ethane - Rice-Herzfeld mechanism.	12
V	**Potentiometry:** Advantages of potentiometric methods - Reference electrode - Standard hydrogen electrode .Acid- alkali or Neutralisation titration, Oxidation – reduction titrations, Precipitation titrations, complexometric titrations, Methods of end point location (Graphical, Differentiation method, Pinkhof- Treadwell method). Calomel electrode -Indicator electrodes: Metal-metal ion electrodes - Inert electrodes -Membrane electrodes - theory of glass membrane potential - Direct potentiometry, potentiometric titrations - Applications.	12

Reference Books:

1. Physical chemistry, G.K.Vemulapalli (Prentice Hall of India).
2. Physical chemistry, P.W.Atkins. ELBS
3. Chemical kinetics - K.J.Laidler, McGraw Hill Pub.
4. Text book of Physical Chemistry, Samuel Glasstone, Macmillan pub.
5. Polymer Sceince, Gowriker,Viswanadham, Sreedhar
7. Elements of Nuclear Science, H.J.Arniker, Wiley Eastern Limited.
8. Quantitative Analysis, A.I. Vogel, Addison Wesley Longmann Inc.
9. Physical Chemistry-G.W.Castellan, Narosa Publishing House, Prentice Hall
10. Physical Chemistry, W.J.Moore, Prentice Hall
11. Polymer Chemistry – Billmayer

Course Focus: Employability

A.G & S.G.SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

I SEMESTER

W.E.F 2022-23 (R22 Regulations)

Title of the Paper: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

Course Code	22PG101	Course Delivery Method	Class Room / Blended Mode - Both
Credits	3	CIA Marks	30
No. of Lecture Hours / Practical Hours	3/1	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2022-23		Year of Offering: 2022 - 23	

The Course will introduce the students to

1) Learn to achieve the highest goal happily.
2) Become a person with stable mind, pleasing personality and determination.
3) Learn to build positive attitude, self-motivation, enhancing self-esteem and emotional intelligence
4) Learn to develop coping mechanism to mange stress through Yoga and meditation techniques
5) Awaken wisdom among them.

Course Learning Outcomes:

At the end of this course the students should be able to:

- Develop their personality and achieve their highest goals of life.
- Lead the nation and mankind to peace and prosperity
- Practice emotional self regulation.
- Develop a positive approach to work and duties
- Develop a versatile personality

Syllabus

Course Details:-

Unit	Learning Units	Lecture Hours
I	**Introduction to Personality Development:-**The concept of personality - Dimensions of Personality – Theories of Personality development (Freud & Erickson) – The concept of Success and Failure – Factors responsible for Success – Hurdles in achieving Success and Overcoming Hurdles — Causes of failure – Conducting SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis.	12

II	**Attitude, Motivation and Self-esteem**:-Conceptual overview of Attitude – Types of Attitudes – Attitude Formation – Advantages/Disadvantages of Positive/Negative Attitude - Ways to Develop Positive Attitude. **Concept of motivation:** Definition and Nature of Motivation/Motive – Internal and external motives – Theories of Motivation – Importance of self- motivation- Factors leading to de- motivation. **Self-esteem**: - Definition and Nature of self-esteem – Do's and Don"ts to develop positive self- esteem – Low self esteem - Personality having low self esteem - Positive and negative self esteem.	12
III	**Other Aspects of Personality Development:-** Body language - Problem-solving - Conflict Management and Negation skills - Decision-making skills - Leadership and qualities of a successful leader – Character building -Team-work – Time management - Work ethics – Good manners and etiquette – Emotional Ability/Intelligence – Dimensions of Emotional Intelligence – Building Emotional Intelligence.	12
IV	**Neetisatakam-Holistic Development of Personality:** Verses- 19,20,21,22 (wisdom) – Verses- 29,31,32 (pride and heroism) – Verses- 26,28,63,65 (virtue) **Personality of Role Model – Shrimad Bhagwadgeeta** Chapter2-Verses 17 – Chapter 3-Verses 36,37,42 – Chapter 4-Verses 18, 38,39 – Chapter18 – Verses 37,38,63.	12
V	**Yoga & Stress Management :**Meaning and definition of Yoga - Historical Perspective of Yoga - Principles of Astanga Yoga by Patanjali – Meaning and Definition of Stress - Types of Stress - Eustress and Distress –Stress Management – Pranayama-Pranayama: Anulom and Vilom Pranayama - Nadishudhi Pranayama - Kapalabhati-Pranayama - Bhramari Pranayama - Nadanusandhana Pranayama – Meditation techniques: Om Meditation - Cyclic meditation : Instant Relaxation technique (QRT), Quick Relaxation Technique (QRT), Deep Relaxation Technique (DRT) (Theory & Practical).	12

PRACTICAL COMPONENTS:

- Students should identify different types of personality to know their own personality. Students are to describe the characteristics of their personalities and submit the same for assessment.
- Students are to form in groups (a group consists of 4-6 students) to identify and write a brief note on famous personalities of India and World.
- Students are required to identify different types of attitudes and give any five examples of each.
- Students are expected to check their attitudes and develop ways to improve their attitudes at work place and home.
- Students are required to identify keys to self-motivation to achieve their goals.
- Students are expected to identify at least seven types of body language and conduct activities with the following:

S. No.	Pose	Possible Interpretations
1	Standing with your hands on your hips	Aggressive, disgusted
2	Standing upright	Confidence

3	Arms crossed on your chest	Defensive
4	Resting your hand on your cheek	Thinking
5	Touching or rubbing your nose	Doubt, lying
6	Resting your head in your hands	Boredom, tired
7	Tapping your fingers	Impatience
8	Biting your nails	Nervous, insecure
9	Playing with your hair	Insecure
10	Rubbing your eyes	Disbelief, doubt

- **Conduct the following exercise to develop communication skills – Negotiation Skills and Empathy**

Exercise: Card Pieces

In this activity, team members trade pieces of playing cards to put together complete cards.

Uses -This exercise is useful for showing team members others' perspectives. It builds communication and negotiation skills **, and helps people to develop** empathy **.**

People and Materials

- Enough people for at least three teams of two.
- Playing cards – use between four and six for each person.
- A private room.

Time -
15minutes.
Instructions:

1. Cut each playing card into half diagonally, then in half diagonally again, so you have four triangular pieces for each card.
2. Mix all the pieces together and put equal numbers of cards into as many envelopes as you have teams.
3. Divide people up into teams of three or four. You need at least three teams. If you're short of people, teams of two will work just as well.
4. Give each team an envelope of playing card pieces.
5. Each team has three minutes to sort its pieces, determine which ones it needs to make complete cards, and develop a bargaining strategy.
6. After three minutes, allow the teams to start bartering for pieces. People can barter on their own or collectively with their team. Give the teams eight minutes to barter.
7. When the time is up, count each team's completed cards. Whichever team has the most cards wins the round.

Advice for the Teacher/Facilitator

After the activity, ask your team members to think about the strategies they used. Discuss these questions:

1) Which negotiation strategies worked? Which didn't?
2) What could they have done better?
3) What other skills, such as **active listening** or **empathy** , did they need to use?

- **Conduct following Time management activity - Ribbon of Life**

Take a colored ribbon length of approximately 1 meter/100 cm. and scissors. Start with the following questions:

1. If the life span of an individual is say, 100 years. Consider that each cm represents one year. The response will be that few live that long. Assuming a life of 75 to 90 years, cut 10 to 25 cm off the ribbon, accordingly.
2. What is the average age of the participants sitting here, the response would be 25 to 30 depending on the group, in that case, cut another 25 cms of the ribbon and say that is gone you cannot do anything.
3. What is left is 50 years? People will say, "Yes," but the answer is NO.
4. Every year we have 52 weeks, that is 52 Sundays. If we multiply that by 50 years, it comes to 7.14 years. Reduce the ribbon by another 7.14 cm.
5. We also usually have Saturdays off, so reduce another 7. cms.
6. Public/National holidays are 10 multiple with 50 years. That comes to another 1.5 years. Reduce ribbon by another 1.5 cms.
7. Your casual leave, sick leave, and annual holidays approx. 40 days a year, multiplied by 50. Cut off another 5 cms. Now you are left with about 29.5 years. But, the calculation is not over yet.
8. You sleep an average of 8 hours daily; multiply that by 365 days and again by 50 years (i.e. 122 days X 50 = almost 17 years). Cut off another 17 cm.
9. You spend time eating lunch, breakfast, snacks, and dinner total 2 hours daily (i.e. 30 days a year X 50 years= 4 years or so). Cut off another 4 cm.
10. Last, let"s figure we spend about 1 hour a day travelling from place to place for activities and such. (that"s about 2 more years). We"re down to 6 (SIX) years of life to make it or break it.

Exercise Decision making skills - Create Your Own

In this exercise, teams must create their own, brand new, problem-solving activity.

Uses

This game encourages participants to think about the problem-solving process. It builds skills such as creativity, negotiation and decision making, as well as communication and time management. After the activity, teams should be better equipped to work together, and to think on their feet.

What You'll Need

- Ideally four or five people in each team.
- A large, private room.

Paper, pens and flip charts

Time -Around one hour.

Instructions:

1. As the participants arrive, you announce that, rather than spending an hour on a problem-solving team building activity, they must design an original one of their own.
2. Divide participants into teams and tell them that they have to create a new problem- solving team building activity that will work well in their organization. The activity must not be one that they have already participated in or heard of.
3. After an hour, each team must present their new activity to everyone else, and outline its key benefits.
4. **Advice for the Teacher/Facilitator:**

There are four basic steps in problem solving: defining the problem, generating solutions, evaluating and selecting solutions, and implementing solutions. Help your team to think creatively at each stage by getting them to consider a wide range of options. If ideas run dry, introduce an alternative brainstorming technique, such as brain writing . This allows your people to develop one others' ideas, while everyone has an equal chance to contribute.

After the presentations, encourage teams to discuss the different decision-making processes they followed. You might ask them how they communicated and managed their time . Another question could be about how they kept their discussion focused. And to round up, you might ask them whether they would have changed their approach after hearing the other teams' presentations.
Students are asked to recite verses: 26,28,63,65 (virtue) of Neetisatakam-Holistic development of personality.

Students are asked to identify personality of role Mmodels from Shrimad Bhagwadgee ta and portray the roles of the same.
Students are asked to practice Yoga and meditation techniques

REFERENCE BOOKS:

1. Hurlock, E.B. Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill, 2006.
2. Gopinath,Rashtriya Sanskrit Sansthanam P, Bhartrihari"s ThreeSatakam, Niti-sringar-vairagya, New Delhi, 2010
3. Swami Swarupananda, Srimad Bhagavad Gita, Advaita Ashram,Publication Department, Kolkata, 2016.
4. Lucas, Stephen. Art of Public Speaking. New Delhi. Tata - Mc-Graw Hill. 2001
5. Mile, D.J Power of positive thinking. Delhi. Rohan Book Company, (2004).
6. Pravesh Kumar. All about Self- Motivation. New Delhi. Goodwill Publishing House. 2005.
7. Smith, B. Body Language. Delhi: Rohan Book Company. 2004
8. Yogic Asanas for Group Training - Part-I: Janardhan Swami Yogabhyasi Mandal, Nagpur.
9. Rajayoga or Conquering the Internal Nature by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata.
10. Nagendra H.R nad Nagaratna R, Yoga Perspective in Stress Management, Bangalore, Swami Vivekananda Yoga Prakashan.

Online Resources:

1. https://onlinecourses.nptel.ac.in/noc16_ge04/preview
2. https://freevideolectures.com/course/3539/indian-philosophy/11

A.G & S.G.SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

I SEMESTER

W.E.F 2022-23 (R22 Regulations)

Title of the Paper: Practical – I – Inorganic Chemistry

(22CH1L1)

S.No	COURSE OUTCOMES	PO`S
	After completion of the course, the student will be able to :	
1	Memorize the basic principles involved in quantitative and qualitative inorganic analysis.	1,7
2	Understand the importance of inorganic qualitative and quantitative analysis and their use in research and industry.	2,6
3	Apply the procedures of quantitative analysis and tests for identification of cations and anions in chosen field.	1,5
4	Evaluate how far these methods are accurate in quantitative determination.	1,4

List of experiments:

1. Preparation of Potassium trisoxalato ferrate (III).
2. Preparation of Tris thiourea copper (1) sulphate.
3. Preparation of Cis and trans potassium diaquodioxalato chromate (III).
4. Preparation of Hexa ammine cobalt (III) chloride.
5. Determination of Zn^{2+} with potassium ferro cyanide.
6. Determination of Mg^{2+} using EDTA.
7. Determination of Ni^{2+} using EDTA.
8. Determination of hardness of water using EDTA.
9. Gravimetric determination of nickel using dimethyl glyoxime.
10. Gravimetric determination of Zn using diammonium hydrogen phosphate.
11. Semi micro qualitative analysis of six radical mixtures
    (One interfering anion and one less familiar cation for each mixture)
    (minimum three mixtures).

Anions: S^{2-} , SO_3^{2-} , Cl^-, Br^-, I^- , NO_3^- , SO_4^{2-}, CH_3COO^-, $C_2O_4^{-2}$, $C_4H_4O_6^{-2}$, PO_4^{3-}, CrO_4^{2-}, BO_3^{3-}

Cations: Ammonium (NH_4^+)

1st group: Ag^+, Pb^{+2}, W^{+6}

2nd group: Pb^{+2}, Bi^{+3}, Cu^{+2}, Cd^{+2}, Sn^{+2}, Sn^{+4} , Mo^{+6}.

3rd group: Fe^{+2}, Fe^{+3}, Al^{+3}, Cr^{+3}, Ce^{+4}, Th^{+4}, Zr^{+4}, VO^{+2}, Be^{+2}.

4th group: Zn^{+2}, Mn^{+2}, Co^{+2}, Ni^{+2}.

5th group: Ca^{+2}, Ba^{+2}, Sr^{+2}.

6th group: Mg^{+2}, K^+, Li^+.

A.G & S.G.SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

I SEMESTER

W.E.F 2022-23 (R22 Regulations)

Title of the Paper: Organic Practical-I (22CH1L2)

S.No	COURSE OUTCOMES	PO`S
	After completion of the course, the student will be able to :	
1	Understand the importance of organic compound synthesis and separation and their role in research and industry.	2,5,6
2	Understand the mechanisms for the synthesis of organic compounds in different steps.	1,7
3	Apply the procedure of synthesis and separation of organic compounds in required field.	1,5,7
4	Interpret the role of separation of organic compounds and synthesis in the core areas of research.	1,5,6

List of experiments:

1. Separation of Binary mixtures of Carboxylic acid + Neutral organic compounds (Solvent extraction method).
2. Separation of Binary mixtures of Basic nature + Neutral organic compounds (Solvent Extraction method).
3. Separation of Binary mixtures of Phenolic compounds + Neutral organic compounds (Solvent extraction method).
4. Preparation of Phthalimide from Phthalic anhydride – High Temperature.
5. Preparation of p-nitro acetanilide – Low temperature.
6. Preparation of Iodoform – Room temperature.
7. Paper chromatography - separate the given mixture of sugars.
8. Paper chromatography - separate the given mixture of amino acids.
9. Thin layer chromatography - separate the given mixture of phenols
10. Thin layer chromatography - separate the given mixture of 2,4-DNP derivatives of carbonyls compounds.

Text books/ Reference books:

1. A.I. Vogel, “A Text Book of Practical Organic Chemistry”, Longman

2. A.I. Vogel, “Elementary Practical Organic Chemistry”, Longman

3. F.G. Mann and B.C. Saunders, “Practical Organic Chemistry”, Longman

4. Reaction and Synthesis in Organic Laboratory, B.S. Furniss, A.J. Hannaford, Tatchell, University Science Books mills valley.

5. Purification of Laboratory chemicals, manual, W.L.F. Armarego EDD Perrin

6. Reaction and Synthesis in Organic Chemistry Laboratory, Lutz-Friedjan- Tietze, Theophil Eicher,University Science Book.

M.Sc. DEGREE EXAMINATION

FIRST SEMESTER

Paper-I :: General Chemistry - I

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions. Each question carries 4 marks.
(5x4M=20M)

1. (a) Discuss the role of control charts in large scale production. (CO-2, L - 2)

(Or)

(b) Elaborate the measures of accuracy? (CO-2, L - 2)

2. (a) Explain the terms primary & secondary standards in titrimetric analys(CO-2, L - 2)

(Or)

(b) Enumerate the significance of mixed indicators. (CO-2, L- 2)

3. (a) Give an account on classification of molecules in microwave spectroscopy. (CO-2, L - 2)

(Or)

(b) Write a short note on degrees of fre (CO-2, L - 2)

4. (a) What are hot bands? (CO-2, L - 2)

(Or)

(b) Construct the group multiplication of C_{2v} point group (CO-2, L - 2)

5. (a) List out the possible symmetry elements and write the point group of the molecule HCHO. (CO-2, L –2)

(Or)

(b) Define a class. Explain with an example. (CO-2, L - 2)

SECTION – B

(10x5=50M)

UNIT - I

6. (a) Write notes on determinate errors. (CO-2, L - 2)

(Or)

(b)(i) What are the criteria for rejection of an observation? (CO-2, L - 2)

(ii) Write notes on significant figures and computational rules. (CO-2, L - 2)

UNIT – II

7. (a) Explain the theory of neutralization indicators. (CO-2, L - 2)

(Or)

(b)Describe the Volhard & Mohr method in precipitation titrations. (CO-2, L - 2)

UNIT – III

8. (a) Explain the spectrophotometric determination of Pk value of an indicator(CO-2, L - 2)

(Or)

(b) Discuss the procedure involved in the determination of phosphate ion and manganese.

(CO-2, L - 2)

UNIT - IV

9. (a) Elaborate in detail the symmetry elements & symmetry operations with suitable examples.

(CO-3, L - 3)

(Or)

(b) (i) Identify the possible symmetry elements in CH_4 & C_6H_6 molecules. (CO-2, L-2)

(ii) Discuss the classification of molecules basing on possible symmetry elements into

MLS, MHS & MOS with examples. (CO-2, L-2)

UNIT - V

10.a) Enumerate the role of group theory in IR & Raman spectroscopy. (CO-3, L- 3)

(Or)

b) Explain the construction of C_{2V} character table. . (CO-3, L- 3)

M.Sc. DEGREE EXAMINATION

FIRST SEMESTER

Paper-II: Inorganic Chemistry - I

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions. Each question carries 4 marks.
(5x4M=20M)

1. (a) Explain the significance of approximation methods. (CO-2, L - 2)

(Or)

(b) Define operator. Explain the significance of operators in quantum mechanics. (CO-2, L - 2)

2. (a) Discuss about Intercalation compounds. (CO-2, L - 2)

(Or)

(b) Enumerate the significance of natural oxygen carriers. (CO-2, L- 2)

3. (a) Explain the role of VSEPR theory in predicting the geometry of molecule (CO-2, L - 2)

(Or)

(b) Give an account on important features of MO theory. (CO-2, L - 2)

4. (a) Explain the splitting of d-orbitals in square pyramidal crystal field. (CO-2, L - 2)

(Or)

(b) Discuss about crystal field stabilization energy. (CO-2, L - 2)

5. (a) Derive a relation between stepwise and overall formation constants (CO-2, L –2)

(Or)

(b) What is chelate effect? Explain with an example. (CO-2, L - 2)

SECTION – B

(10x5=50M)

UNIT - I

6. (a) Write down the wave equation for rigid rotor and solve it to get eigen functions. (CO-3, L - 3) **(Or)**

(b) Arrive at the expression for first order non degenerate eigen values of perturbation method.

(CO-3, L - 3)

UNIT – II

7. (a) Write an account on phosphorus-nitrogen cyclic compounds (CO-2, L - 2)

(Or)

(b) Explain the structure and bonding in nitrosyl complexes. (CO-2, L - 2)

UNIT – III

8. (Or)

(b) Explain the evidences for pπ – dπ bonding in non-transition metal compounds. (CO-3, L - 3)

UNIT - IV

9. (a) Discuss tetragonal distortion in an octahedral complex with a suitable example. (CO-3, L - 3)

(Or)

(b) Why CN^- and CO cause greater crystal field splitting and I^- and Br^- cause lesser crystal field splitting? Explain. (CO-3, L-3)

UNIT - V

10. (a) Describe the spectrophotometric method for the determination of stability Constant. (CO-2, L- 2)

(Or)

(b) Give a detailed account on HSAB theory. (CO-2, L- 2)

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M.Sc. DEGREE EXAMINATION

FIRST SEMESTER

Paper-III : Organic Chemistry - I

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions. Each question carries 4 marks.
(5x4M=20M)

1. (a) Explain anti aromaticity with example. (CO-2, L - 2)

(Or)

(b) Explain cross conjugation with example. (CO-2, L - 2)

2. (a) Explain the structure of nitrenes. (CO-2, L - 2)

(Or)

(b) Discuss the structure of carbenes. (CO-2, L - 2)

3. (a) Discuss cram's rule with suitable examples. (CO-2, L - 2)

(Or)

(b) Write notes on epoxidation. (CO-2, L - 2)

4. (a) Define Hoffmann's rule. Give suitable examples. (CO-2, L - 2)

(Or)

(b) Discuss syn elimination versus anti elimination. (CO-2, L - 2)

5. (a) Give mechanism of Von-Richter rearrangement. (CO-2, L - 2)

(Or)

(b) Write noters on SNi mechanism. (CO-2, L - 2)

SECTION – B

(10x5=50M)

UNIT - I

6. a) Define delocalized chemical bonding. What are different types of delocalized chemical bonding. (CO – 2, L - 2)

(Or)

b) Explain the following terms (i) Cross Conjugation (ii)Hyper Conjugation. (CO – 2, L - 2)

UNIT - II

7. a) Discuss the generation, stability and reactivity of carbocations. (CO – 2, L - 2)

(Or)

b) Explain synthesis and few reactions of the following

(i) Free radicals (ii) Carbanions (CO – 2, L - 2)

UNIT - III

8. a) Give an account of the addition of the following to carbon carbon multiple bonds

(i) HX (ii) HOX (CO – 2, L - 2)

(Or)

b) Discuss in detail about the following

(i) Syn and Anti hydroxylation (ii) Hydrogenation (CO – 2, L - 2)

UNIT – IV

9. a) Discuss pyrolytic eliminations and its orientation. (CO – 2, L - 2)

(Or)

b) Write a detailed account of E1CB mechanism. (CO – 2, L - 2)

UNIT – V

10.a) What is anchimeric assistance. Discuss neighbouring group participation by

σ and π bonds. (CO – 3, L - 3)

(Or)

b) Explain the following (i) Benzyne mechanism (ii) SN^{Ar} mechanism. (CO – 3, L - 3)

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M.Sc. DEGREE EXAMINATION

FIRST SEMESTER

Paper-IV : Physical Chemistry - I

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions. Each question carries 4 marks.
(5x4M=20M)

1. (a) Explain the second law of thermodynamics. (CO-2, L - 2)

(Or)

(b) Write the Gibbs Duham equation and describe all the terms present.(CO-2, L - 2)

2. (a) Discuss briefly the surface active agents. (CO-2, L - 2)

(Or)

(b) Explain the micro emulsions in brief. (CO-2, L - 2)

3. (a) Write the nernest equation and describe all the terms present in it. (CO-2, L - 2)

(Or)

(c) Explain the principle in conductometric titrations. (CO-2, L - 2)

4. (a) Write the mechanism in Lindemann's theory of unimolecular reactions. (CO-2, L - 2)

(Or)

(b) Describe the mechanism in decomposition of Acetaldehyde. (CO-2, L - 2)

5. (a) Describe the advantages of potentiometric methods over classical methods. (CO-2, L - 2)

(Or)

(b) Explain the calomel electrode in short. (CO-2, L - 2)

SECTION – B **(10x5=50M)**

UNIT - I

6. (a) Derive the Maxwell's thermodynamic relations. (CO-2, L - 2)

(Or)

(b) What is fugacity? Give its physical significance. Describe the different methods of

determination of fugacity. (CO-3, L - 3)

UNIT - II

7. (a) Discuss the theory involved in ESCA. How are this techniques used in the

analysis of surfaces? (CO-2, L - 2)

(Or)

(b) What is CMC? How is it determined? What are the factors effecting CMC? (CO-2, L - 2)

UNIT - III

8 . (a)What is activity? How is activity coefficient determined from EMF? (CO-2, L - 2)

(Or)

(b)What is the effect of dilution on equivalent conductance of electrolytes? (CO-2, L - 2)

UNIT – IV

9. (a) Discuss the kinetics of consecutive reactions. (CO-2, L - 2)

(Or)

(b) Discuss the kinetics of $H_2 – Br_2$ reaction in detail. (CO-3, L - 3)

UNIT - V

10. (a) Explain the theory of precipitation titrations in detail. (CO-2, L - 2)

(Or)

(b) Discuss the potentiometric titrations in detail. (CO-2, L - 2)

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A.G & S.G. Siddhartha College of Arts & Science : Vijayawada – 520 010

Department of Chemistry

CIA Practicals

Total Marks – 30 M

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M.Sc. DEGREE EXAMINATION

External Practical Model Paper

Time: 6 hours **Maximum Marks: 70**

1. To write the principle and procedure / mechanism related to practical as listed in the practical syllabus – 5 M

2. Record – 10 M

3. Experiment (Procedure / Tabulation / calculation etc.,) – 50 M

Result / Graphs / Yield / Report – 5 M

A.G & S.G.SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

III SEMESTER

Paper Code & Title: 22CH3T1: ORGANIC SPECTROSCOPY

No. of hours per week: 04 **Total credits: 04**

Total marks: 100 **(Internal: 30 M & External: 70M)**

Course: Organic Spectroscopy (code 22CH3T1)		
S.No	COURSE OUTCOMES	PO`S
	The graduate will be able to	
1	Memorize the basic principles and theory involved in molecular absorption spectroscopy.	2,7
2	Comprehend the advanced concepts of molecular absorption spectroscopy.	1,2,5
3	Apply the knowledge of spectroscopy in establishing the structure of organic molecules.	1,5,7
4	Analyze the spectral data to ascertain the structure of unknown molecules.	1,4,2

UNIT- I

UV- Visible Spectroscopy:

Mechanics of measurement – Energy transitions – Simple chromophores – Auxochrome, Absorption shifts (Bathochromic shifts, Hypsocromic shift, Hyper chromic shift, Hypo chromic shift). UV absorption of Alkenes – polyenes, unsaturated cyclic systems .

UV absorption of Carbonyl compounds α,β-unsaturated carbonyl systems - UV absorption aromatic systems – solvent effects – geometrical isomerism – acid and base effects – typical examples – calculation of λmax values for simple molecules using Woodward -Fieser rules.

UNIT – II

IR Spectroscopy:

Mechanics of measurement – Fundamental modes of vibrations -Stretching and bending vibrations – Factors effecting vibrational frequency-hydrogen bonding.

Finger print region and its importance. Typical group frequencies for – CH,

-OH, -NH, -CC, -CO and aromatic systems - Application in structural determination Examples – simple problems.

UNIT – III

Nuclear Magnetic Resonance Spectroscopy (1HNMR – First Order PMR):

Introduction:Nuclear spin-Basic principle of -NMR - nuclear resonance –saturation-Larmor's frequency-Relaxation- Instrumentation(Cw and FT) shielding and de shielding of magnetic nuclei-chemical shift and its measurements, factors influencing chemical shift, spin–spin interactions and factors influencing spin -spin coupling- Dynamic NMR- coupling constant J. and factors effecting J value.

UNIT – IV

Mass Spectrometry I

Introduction- ionization methods-EI, CI, ES, MALDI and FAB – advantages and disadvantages-molecular ion peak and its importance, meta stable peak, Nitrogen rule and extension of nitrogen rule. Determination of Molecular weight and determination of molecular formulae- Isotopic Peaks-Identification of single chlorine atom and double chlorine atom single bromine atom and double bromine atoms in organic compounds. Instrumentation.

UNIT – V

Mass Spectrometry II

Fundamental fragmentation process- Stevenson's rule- radical site initiated cleavage-charge site initiated cleavage- two bond cleavage- Retrodielalder cleavage- Mc-Lafferty rearrangement and other cleavages. Mass spectral fragmentation of alkanes, cycloalkanes, alkenes, alkynes, aromatic hydrocarbons, alcohols, phenols, thiols, ethers, carbonyl containing compounds (Aldehydes, ketones, esters and carboxylic acids), nitrogen compounds, alkyl chlorides and alkyl bromides, Examples of mass spectral fragmentation of organic compounds with respect to their structure determination.

Text books/ Reference books:

1. Introduction to Spectroscopy – D. L. Pavia, G.M. Lampman, G. S. Kriz, 3rd Ed. (Harcourt

college publishers).

2. Spectrometric identification of organic compounds R. M. Silverstein, F. X. Webster, 6th Ed.

John Wiley and Sons.

3. Spectroscopic methods in organic chemistry - D. H. Williams and I. FlemmingMc.Graw Hill.

4. Absorption spectroscopy of organic molecules – V. M. Parikh

5. Nuclear Magnetic Resonance – Basic Principles- Atta-Ur-Rehman, Springer-Verlag (1986).

6. One- and Two-dimensional NMR Spectroscopy – Atta-Ur-Rehman, Elsevier (1989).

7. Organic structure Analysis- Phillip Crews, Rodriguez, Jaspars, Oxford University Press (1998).

8. Organic structural Spectroscopy- Joseph B. Lambert, Shurvell, Lightner, Cooks, Prentice-Hall (1998).

9. Organic structures from spectra –Field L.D., Kalman J.R. and Sternhell S. 4th Ed. John Wiley and sons Ltd.

A.G & S.G.SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

III SEMESTER

Paper Code & Title: 22CH3E1: ORGANIC REACTION MECHANISM

No. of hours per week: 04 **Total credits: 04**

Total marks: 100 **(Internal: 30 M & External: 70M)**

Course: Organic ReactionMechanism (code 22CH3E1)		
S.No	COURSE OUTCOMES	PO`S
	The student will be able to	
1	Acquire sound knowledge of oxidations, reductions, molecular rearrangements, pericyclic reactions and photo chemistry.	2
2	Understand the concepts involved in oxidations, reductions, molecular rearrangements, pericyclic reactions and photo chemistry.	1,7
3	Apply the conceptual knowledge gained in oxidations, reductions, molecular rearrangements, pericyclic reactions and photo chemistry in chosen fields.	1,5,6
4	Analyse and categorise the various types oxidations, reductions, molecular rearrangements, pericyclic reactions and photo chemistry in a given reactions.	1,7,4

UNIT-I

Oxidations

Definition and types of Oxidations,oxidations with ruthenium tetroxide,NBS,iodobenzenediacetate,Tl(III) nitrate, Chromium (VI) oxidants, Lead tetra acetate, SeO_2, MnO_2, Ag_2CO_3, Oppenauer oxidation, perhydroxylation using $KMnO_4$, OsO_4, HIO_4,oxidation withiodine silver carboxylate (Woodward and Prevost conditions), Definition & mechanism of epoxidation by peracids.

UNIT-II

Reductions

Definition and types of reductions, reduction by dissolving metals - Reduction with metal and liquid ammonia (Birch Reduction of aromatic compounds), Reduction with metal acid -Clemensons reduction, Reduction by hydride transfer reagents, Aluminiumalkoxide - MeerweinPondorfVerley Reduction, $LiAlH_4$, $NaBH_4$, Diisobutylaluminium hydride(DIBAL), Sodium cyanoborohydride,trialkylborohydrides, Reduction with diimide,. Wolff-Kishnerreduction.

UNIT-III

Molecular Rearrangements

Migration toelectron deficient carbon atom**.**Pinacole-Pinacolone rearrangement, Wagner-Meerwein rearrangement, Dienone-Phenolrearrangement, Benzil-Benzilic acid rearrangement, Favorski rearrangementArndt Eistert rearrangement, Sommelet – Hauser rearrangement.

Migration to electron deficient hetero atom:.Wolf, Hofmann, Curtius,Lossen, Schmidt, Beckmann rearrangement, Baeyer-Villiger rearrangement,Stevens, Neber rearrangements.Fries, Fischer-Hepp, Orton,Bamberger, Dakin, CumeneHydroperoxide rearrangement.

UNIT-IV

Pericyclic Reactions – I:

Definition, classification of pericyclic reactions, Molecular Orbital energy level diagrams, electronic configuration in ground and first excited states of Ethylene, 1,3-Butadiene, 1,3,5 – Hexatriene, allyl system, stereo chemical notations – suprafacial, antarafacial, conrotatory and disrotatory modes, Woodward and Hoffmann selection rules.

Electrocyclic reactions: Mechanism, Stereochemistry of(4n) and (4n+2) π systems. PMO, FMO and correlation methods.

Cyclo additions:Mechanism, stereochemistry of (2+2) and (4+2)π systems, PMO, FMO and correlation methods.

Sigmatropic rearrangements:Classification, mechanism for FMO and PMO approach under thermal and photo chemical conditions.(Detailedtreatment of Claisen, Cope rearrangementsfluxionalmolecules, aza-cope rearrangements).

UNIT-V

Photochemistry:

Photochemical processes: Energy transfer, sensitization and quenching. Singlet and triplet states and their reactivity. Photochemistry of olefins – conjugated olefins, Aromatic compounds–

isomerisation–additions. Photochemistry of carbonyl compounds – Norrish type I and II reactions – Paterno – Buchi Reaction.

Photoreduction, Photochemical rearrangements–PhotoFries rearrangement,Di-π-methane rearrangement.

Reactions of unactivated C – H bonds: The Hoffmann Loffler freytag reaction, Barton reaction, photolysis of organic nitrites, photolysis of N – nitrosoamides.

References:

17. Molecular reactions and Photochemistry by Charles Dupey and O. Chapman, Prentice Hall.
18. Reaction mechanism in organic chemistry. 3rd edition, S.M.Mukherji&singh.
19. Advanced Organic Chemistry-Reactions, Mechanisms and Structure, Jerry March, John Wiley and sons, 6th edition.

4..Advanced Organic Chemistry, F.A. Carey and R.J Sundberg, Plenum.

5. Modern methods of organic synthesis, Cambridge University press, 3rd edition, W.Carruthers.
6. Organic Reaction Mechanisms, V.K.Ahluwalia, 4th edition, Narosa.
7. Reactions, rearrangements and reagents.S.N.Sanyal,4th edition.
8. Organic Photo chemistry and Pericyclic reactions' M.G.AroraAnmol Publications Pvt. Ltd.
9. Fundamentals of Photochemistry by K.K.Rohatgi–Mukherjee New Age international publishers.

A.G & S.G.SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

III SEMESTER

Paper Code & Title: 22CH3E2: ORGANIC SYNTHESIS

No. of hours per week: 04 **Total credits: 04**

Total marks: 100 **(Internal: 30 M & External: 70M)**

Course: Organic Synthesis (code 22CH3E2)		
S.No	COURSE OUTCOMES	PO`S
	The student will be able to	
1	Memorize the concepts, principles and theories related to formation of C – C single bond, C – C double bond, Diel's Alder related reactions. Protecting groups and disconnection approach in organic synthesis.	2
2	Understand the role and significance of formation of C – C single bond, C – C double bond, Diel's Alder related reactions. Protecting groups and disconnection approach in organic synthesis.	1,7
3	Apply the conceptual knowledge gained in formation of C – C single bond, C – C double bond, Diel's Alder related reactions. Protecting groups and disconnection approach in organic synthesis as and when required.	1,6,4
4	Analyze the role of various reagents in carrying out the organic reactions like formation of C – C single bond,C – C double bond, Diel's Alder related reactions.Protecting groups and disconnection approach in organic synthesis.	1,3,5

UNIT-I

Formation of carbon-carbon single bonds:

Alkylation of relatively acidic methylene groups, alkylation of ketones, alkylation of enolates,enamine and related reactions, umplong (dipole inversion).

Allylic alkylation of alkenes, alkylation of α-thiocarbanions- α-selenocarbanions, formation of carbon carbon single bonds by the addition of free radicals to alkenes, synthetic applications of carbenes and carbenoids.

UNIT-II

Formation of carbon-carbon double bonds

Pyrolyticsyn elimination reactions sulphoxide-sulphenate rearrangement, synthesis of allyl alcohols, the witting reaction, alkenes from sulphones, decarboxylation of β-lactones, alkenes from aryl sulphonylhydrazones, claisen rearrangement of allyl vinyl ethers.

Stereo selective synthesis of tri and tetra substituted alkenes, fragmentation reactions oxidative decarboxylation of carboxylic acids, stereospecific synthesis from 1,2-diols, reductive dimerization of carbonyl compounds.

UNIT-III

Diels–Alder and related reactions: The dienophile, heterodienophile, oxygen as dienophile, The diene, acyclic dienes, heterodienes, 1,2-dimethylene cycloalkanes, vinyl cycloalkenes, and vinyl arenes, cyclic dienes and furans.

Intra molecular Diels –Alder reactions, stereochemistry and mechanism of Diels – Alder reaction, retro Diels – Alder reaction, catalysis by lewis acids, photosensitized Diels- Alder reactions and 1,3-dipolar cycloaddition reactions, the ene reaction.

UNIT-IV

Disconnection approach

Introduction to Retro-synthetic analysis, Disconnection approach with suitable examples, Definitions: FGI, Disconnection, synthons, synthetic equivalent, reagent, target molecule, General strategy: choosing a disconnection, greatest simplification, symmetry, high yielding steps, recognizable starting materials.

Chemo, regio and stereo selectivity with examples. One group C-C disconnections-Alcohols, carbonyl compounds, alkene synthesis, two group disconnections: 1,3 – dicarbonyl compounds, α,β – unsaturated carbonyl compounds.

UNIT-V

Protecting groups:

Theory and importance of functional group protection and deprotection in organic

synthesis:-Protecting agents for the protection of functional groups: Hydroxyl group, Amino group, Carbonyl group and Carboxylic acid group

carbon-carbon multiple bonds; chemo- and regioselective protection and deprotection. Illustration of protection and deprotection in organic synthesis.

References:

1. Modern methods of Organic synthesis , W. Carruthers Cambridge Press (3rd edition)

2. Principles of Organic synthesis by, ROC Norman, 3rd edition, CRC press.

3. Modern Method of Organic Synthesis,CarruthersandColdhamSachinkumarGhosh,

Canbridge New Central Book Agency,1st edition.

4.Advances in Organic Reaction mechanism and structure, J. March, 6th edition, McGrew Hill

5. Organic Synthesis: Ratnakumarkar, vol – II, NCBA Publications.

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DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

III SEMESTER

Paper Code & Title: 22CH3E3: NATURAL PRODUCTS

No. of hours per week: 04 **Total credits: 04**

Total marks: 100 **(Internal: 30 M & External: 70M)**

Course: NATURAL PRODUCTS (code 22CH3E3)		
S.No	COURSE OUTCOMES	PO`S
	The student will be able to	
1	Memorize the concepts related to Alkaloids, Terpenoids, Steroids, Flavonoids and Isoflavonoids and Pigments.	2
2	Understand the chemical role of Alkaloids, Terpenoids, Steroids, Flavonoids and Isoflavonoids and Pigments.	1,7
3	Execute the conceptual knowledge gained in the areas of Alkaloids, Terpenoids, Steroids, Flavonoids and Isoflavonoids and Pigments.	1,6
4	Analyze the role of methods involved in structure elucidation of Alkaloids, Terpenoids, Steroids, Flavonoids and Isoflavonoids and Pigments.	1,7

UNIT-I

Alkaloids: Introduction, Definition, occurrence, role of alkaloids in plants, classification, isolation and general methods for structural elucidation of alkaloids. Structure elucidation and synthesis of Morphine, Quinine, Ephedrine and Nicotine.

UNIT-II

Terpenoids: Introduction, Definition, nomenclature, classification, isolation, isoprene rule and general methods for structural elucidation of Terpenoids. Structure elucidationand synthesis of Zingiberene, farnesol and α - Terpeneol.

UNIT-III

Steroids: Introduction, Definition, nomenclature, classification. Occurrence, isolation, physiological action, structure elucidation and synthesis of Cholesterol, Androsterone, Progesterone, and Testosterone.

UNIT-IV

Flavonoids and Isoflavonoids: Introduction, Definition, classification, isolation, physiological action, structure elucidation and synthesis of Kaempferol and Quercetin.

UNIT-V

Pigments: Introduction, classification of natural pigments, introduction and classification of carotenoids, functions of carotenoids in plants and animals, structure and synthesis of α – carotene and β – carotene.

References:

1.Organic Chemistry, Vol:2, I.L.Finar, 5th Edition.
2. Chemistry of Natural Products,K.W.Bentley
3. ChemistryofNaturalproductsbyP.S.KalsiKalyaniPublishers.1983, low cost university edition.
4. Chemistry and physiology of alkaloids by ManskeVol.I&II,VII

A.G & S.G.SIDDHARTHA COLLEGE OF ARTS & SCIENCE

DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

III SEMESTER

Paper Code & Title: 22CH3E4: ASYMMETRIC SYNTHESIS, PHOSPHORUS & SULPHUR REAGENTS, SYNTHETIC POLYMERS, BIOMOLECULES & BIO ORGANIC CHEMISTRY

No. of hours per week: 04 **Total credits: 04**

Total marks: 100 **(Internal: 30 M & External: 70M)**

Course:ASYMMETRIC SYNTHESIS, PHOSPHORUS & SULPHUR REAGENTS, SYNTHETIC POLYMERS, BIOMOLECULES & BIO ORGANIC CHEMISTRY (code 20CH3T3B)		
S.No	COURSE OUTCOMES	PO`S
	The student will be able to	
1	Memorize the concepts of asymmetric synthesis, formation of carbon double bond, synthetic polymers, biomolecules and bio inorganic chemistry.	1,2,4,7
2	Comprehend various organic synthesis.	1,2,4,7
3	Apply the conceptual knowledge gained in determining the mechanism involved in asymmetric synthesis, as well as reactions involving various reagents.	1,2,7
4	Analyse as to how far various reagents are useful in carrying out asymmetric synthesis and other organic reactions.	1,3,4
5	Evaluate the role of various reagents in asymmetric synthesis and other organic reactions.	1,2,6,7

UNIT – I

Asymmetric Synthesis

Topocity - Prochirality- Substrate selectivity - Diastereoselectivity and enantioselectivity-Substrate controlled methods-use of chiral substrates - examples

Auxiliary controlled methods-Use of chiral auxiliaries-Chiral enolates-alkylation of chiral imines – Stereoselective Diels-Alder reaction

Reagent controlled methods-Use of chiral reagents-Asymmetric oxidation-Sharplessepoxidation-Asymmetric reduction-Use of lithium aluminium hydride and borate reagents.

UNIT – II

Phosphorus Reagents

Formation of carbon-carbon double bonds-Functional group transformations – deoxygenation reactions-reactivity as electrophiles- conversitoon of alcohols to alkyl halides, Witting reaction and nucleophiles - Corey-Winters reaction, Michaelis-Arbusov reaction-Perkow reaction and Mitsnobu reaction.

Sulphur Reagents- Sulphurylides, stabilized and non-stabilized – Preparation and reactivity Pummerer reaction – sulphonylcarbanions-Julia reaction.

UNIT – III

Synthetic Polymers

Polymer Reactions-Addition and condensation polymerization processes- Bulk, Solution, Suspension and Emulsion polymerization.

Stereospecific Polymers-Preparationand significance- classification of polymers based on physical properties-Thermoplastics-Thermosetting plastics-Fibers and elastomers- General applications.

Preparation of Polymers-Preparation of Polymers based on different types of monomers Industrial applications-olefin polymers-Diene polymers-nylons-Glyptal resins-Urea-formaldehyde, phenol-formaldehyde and melamine resins- Epoxy resins - Ion exchange resins.

UNIT – IV

Biomolecules

Peptides and Proteins-Methods of peptide synthesis, sequence determination, structure of oxytocin, proteins-classification, structure, conformation and properties. Nucleic acids- Nucleosides, Nucleotides, DNA and RNA, structure and conformations, replication, translation of genetic material, genetic code, gene expression, gene mutation, protein synthesis.

ons, replication, translation of genetic material, genetic code, gene expression, gene mutation, protein synthesis.

UNIT – V

Bioorganic Chemistry

Carbohydrates: Structure and biological functions of mucopolysaccharides, glycoproteins, and glycolipids- Role of sugars in biological recognition- Blood group substances

Enzymes: Nomenclature and classification, properties, factors affecting enzyme catalysis, enzyme inhibition- reversible and irreversible inhibition. Uses of enzymes in food drink industry and clinical laboratories.

References:

1. Advanced Organic Chemistry-Reactions, Mechanism and Structure, Jerry March, John Wiley.
2. Polymer Chemistry by V.R.Goweriker, N.V.Viswanathan, JayaderSreedhar, New Age International (P) Limited, Publishers.
3. Advanced Organic Chemistry, F.A. Carey and R.J Sundberg, Plenum.
4. Principles of Organic Synthesis, R.O.C. Norman and J.M Coxon, Blackie
5. Structure and Mechanism in Organic Chemistry C.K.Inglod, Cornell University Press.
6. Modern Synthetic Reactions, H.O. House, W.A. Benjamin.

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DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

III SEMESTER

Paper Code & Title: 22CH3E5: Retro Synthetic Analysis

No. of hours per week: 04 **Total credits: 04**

Total marks: 100 **(Internal: 30 M & External: 70M)**

	Course:Retro Synthetic Analysis (code 22CH3E5)	
S.No	COURSE OUTCOMES	PO`s
	The student will be able to	
1	Understand the basic concepts of Retro synthetic analysis	1,7
2	Apply the knowledge of Retro synthetic analysis in designing new synthetic strategies	1,4,6
3	Analyse the approach of Retro synthetic analysis are useful in designing the synthesis.	1,5,7
4	Evaluate whether the synthetic route will result in the desired product or not.	1,5,6,3
5	Memorize the basic concepts related Retro synthetic analysis.	2,7

UNIT-I

Disconnection Approach – Principles : Introduction, Terminology:
Retrosynthesis, Target Molecule (TM), synthon, synthetic equivalent,functional group interconversion (FGI). Linear and convergent synthesis.Criteria for selectionoftarget.OrderofeventsinretrosynthesiswithreferencetoSalbutamol,Proparcaine andDopamine.Chemoselectivity,Regioselectivity,reversalofpolarityandcyclizations.

UNIT-II

C-X disconnections:
one group C-X disconnections (Carbonylderivatives,ethers,sulphidesandalcohols),Two group C-X disconnections (1,1-difunctionalised, 1,2- difunctionalised and 1,3-difunctionalisedcompounds),
Control in carbonyl condensations, selective organic transformations: chemoselectivity,regioselectivity, stereoselectivity, enentioselectivity, cyclization reactions,amine synthesis.

UNIT-III

C-C Disconnections One group C-C Disconnections:

Alcohols and carbonyl compounds (1,1-C-C, 1,2-C-Cand 1,3-C-C), Alkene synthesis,use of acetylenes and aliphatic nitro compounds in organic synthesis. Two group C-C Disconnections:Diels-Alder reactions, 1,3difunctionalized compounds and α, β-unsaturated compounds, controlin carbonyl condensations, 1,5 difunctionalized compounds, Michael addition.

UNIT-IV

Protecting Groups :

Protection and deprotection of hydroxyl, carbonyls, amines, carboxylicacids, alkenes and alkynes

UNIT-V

Ring Synthesis Introduction to ring synthesis, saturated heterocycles, synthesis of three, four, five and six membered rings and their fused anologs, Robinsonannelation.

Course outcome: Students opting this course will have through knowledge on retrosynthesis and designing organic synthesis making use of retrosynthetic analysis.

Reference Books:

1. Organicsynthesesviaboranes/HerbertC.Brown;withtechniquesbyGaryW. Kramer,
2. AlanB.Levy,M.MarkMidland.NewYork:Wiley,1975
3. Some Modern Methods of Organic Synthesis W. Carothers, Third Edition, Cambridge University Press, Cambridge, 1988.
4.Organic Synthesis: The disconnection approach, S. Warrant John Wiley & sons, NewYork, 1984.
5. ModernSyntheticReactions,HerbertO.House,SecondEdition,W.A.Benzamine Inc. Menio Park, California, 1972.
6. PrincipleofOrganicSynthesis-R.O.C.NormanandJ.M.Coxon.(ELBS)
7. OrganicSynthesis:Specialtechniques.V.K.AhulwaliaandRenuAggarwal.
8. OrganicSynthesisbyCWillisandMWillis 9. ProblemsonorganicsynthesisbyStuartWarren

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DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

III SEMESTER

Paper Code & Title: 22CH3E6: ENVIRONMENTAL CHEMISTRY AND ANALYSIS

No. of hours per week: 04 **Total credits: 04**

Total marks: 100 **(Internal: 30 M & External: 70M)**

Course: ENVIRONMENTAL CHEMISTRY AND ANALYSIS (code 22CH3E6)		
S.No	COURSE OUTCOMES	PO`S
	The student will be able to	
1	Memorize the concepts of environmental and its analysis.	1,3
2	Understand the basic significance of segments of environment and soil erosion, soil fertility as well as soil analysis	1,2,4
3	Apply the knowledge of environmental chemistry in addressing the present environmental conditions.	1,2,6
4	Analyse different problems related to environmental issues.	2,4,7
5	Evaluate that how far the existing solutions related to environmental issues can be useful to overcome the novel problems of environment.	1,6,4

UNIT-I

Significance of basic segments of Environment-Nomenclature in the study of Environmental Chemistry., SOIL CHEMISTRY & POLLUUTION STUDIES: Principles of weathering-effect of temperature, water, air, plants and animals on weathering., Soil formation/development-factors affecting soil development-physical properties of soil; soil colloids-ion exchange proerties.,Soil fertility, productivity- Soil nutrients-micro and macro.

UNIT- II

STUDY OF WATER POLLUTION AND MONITORING AND TREATMENT METHODS OF WATER POLLUTANTS: Hydrosphere-water resources-hydrological cycle-unique properties of water- water

quality parameters., Pollution from Domestic water ,industrial, agricultural, solid waste, shipping, radioactive waste & thermal pollution , Effect of specific pollutants like mercury, lead, arsenic, selenium, nitrates, oil.,

Unit- III

Effects of soaps, detergents, pesticides, hydrocarbon with regard to water pollution: Techniques of water treatment-Primary, secondary and tertiary methods-use of coagulants-flash distillation-solar stills, ion exchange reverse osmosis, electro dialysis.

UNIT -IV

STUDY OF AIR POLLUTION AND MONITORING AND TREATMENT METHODS IN CASE OF AIR POLLUTION: Atmospheric sources and emission of air pollutants-carbon monoxide-sulphur ,oxides-oxides of nitrogen,organic pollutants and photo chemical smog-particulates-acid rain and radioactive substances. Continuous monitoring of air pollutants-Principles,Monitoringinstruments,monitoring of sulphurdioxide,hydrogensulphide,oxides of nitrogen, oxides of carbon, hydrocarbons, ozone and suspended particulate matter and radioactive substances.

UNIT-V

ENVIRONMENTAL CHEMICAL ANALYSIS: Analysis of soil: Sampling,determination of moisture,total nitrogen, phosphorus, silicon, lime, humus, nitrogen, alkali salts., Analysis of water samples : Dissolcvedoxuygen,Chemical oxygen demand ,Biological oxygen demand,Phosphates,nitrogencompounds.analysis of metalicconstitutents, Analysis of Air samples: carbon mono oxide,carbondioxide,sulphurdioxide,hydrogensulfide,oxides of nitrogen,ammonia,ozone, hydrocarbons and aromatic hydrocarbons.,

SUGGESTED BOOKS:

1.EnvironmentalChemsitry by A.K.De, Wiley Eastern Limited, New Delhi

2.A Text Book of Environmental Chemistry by O.D.Tyagia and M.Mehra-AnmolPublicaitons,
3.Environmental Pollution Control and Engineering by C.S.Rao , Wiley Eastern Limited,

4.Environmental Chemistry by P.S.Sindhu,-New Age International Publishers

5.A Text Book of Environmental Chemistry and Poolution Control by S.S.Dara ,S.Chand& Co
6.Environmental Pollution Analysis by S.M.Khopkar, Wiley Eastern Limited, New Delhi

7.AanalyticalAgricultrual Chemistry by S.L.Chopra&J.S.Kanwar -- Kalyani Publishers

8.Mannual of soil, plant, water and fertilizer analysis, R.M.Upadhyay and N.L 5harma, Kalyani

Publishers, New Delhi

9.Environmental Chemistry by B.K.Sharma- Goel Publishing House, Meerut.

10.Soil Chemical Analysis by M.L.Jsackson,Prentice-Hall India Pvt Ltd, New Delhi

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DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

III SEMESTER

Paper Code & Title: 22 OECH 301: POLYMER CHEMISTRY

No. of hours per week: 03 **Total credits: 03**

Total marks: 100 **(Internal: 30 M & External: 70M)**

Unit-I

Introduction, Classification of polymers, Polymerization, chain polymerization, step polymerization, Co polymerization, Free radical chain polymerization, cationic polymerization, anionic polymerization, Polymerization Techniques, Graft and Block Copolymers.

Unit-II

Polymer Synthesis,Isolation and Purification of polymers, Polymer Fractionation, Molecular weight determination,Molecular weight determination curve, Processing Techniques.

Unit-III

Polymer Reactions–Introduction, Hydrolysis, Acidolysis, Aminolysis, Hydrogenation, Addition and Substitution Reactions, Cyclisation reactions, Cross-linking Reactions.

Unit-IV

Polymer Degradation – Definition, Types of Degradation, Thermal Degradation, Mechanical Degradation, Degradation by Ultrasonic Waves, Photodegradation, Degradation by High-Energy Radiation, Oxidative Degradation, Hydrolytic Degradation.

Unit-V

Plastics, Fibres, Elastomers-Polyethylene, Polystyrene, PolyEsters, PolyAcrylonitrile Polyurethanes, Polyvinyl Chloride, Polyisoprenes. Resins–Phenol Formaldehyde Resin, Urea Formaldehyde and Melamine–Formaldehyde Resins,Epoxy Polymers, Silicon Polymers.

Reference Books:

1. TextbookofPolymerSciencebyFrod,W.Billmayer,

2. An IntroductiontoPolymerChemistrybyMoore.

3. PolymerChemistry-AnIntroductionbyM.P.Stevens.

4. PolymerScience –VRGowariker,NVViswanathan,JayadevSreedhar.

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DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

III SEMESTER

Paper Code & Title: 22CH OE 302 : BASIC BIO CHEMISTRY

No. of hours per week: 03 **Total credits: 03**

Total marks: 100 **(Internal: 30 M & External: 70M)**

Course: BASIC BIO CHEMISTRY(code:22CH OE 302)		
S.No	COURSE OUTCOMES	PO`S
	The graduate will be able to	
1	Memorize the basic concepts related to chemistry in daily life like – chemistry Laboratory safety symbols, environmental chemistry, bioinorganic chemistry, vitamins, antibiotics and hormones.	2,7
2	Understand the concepts like chemistry Laboratory safety symbols, environmental chemistry, bioinorganic chemistry, vitamins, antibiotics and hormones.	1,2,6
3	Apply the knowledge gained in the concepts like chemistry Laboratory safety symbols, environmental chemistry, bioinorganic chemistry, vitamins, antibiotics and hormones in future job roles.	1,4,7

Course Learning Objective(S): The main objective of this paper is to give a basic and updated knowledge for the students on Chemistry Laboratory safety symbols – Meaning, Environmental Chemistry, Bioinorganic Chemistry, Biological functions of Hormones and Medicinal chemistry.

Unit-I: Chemistry Laboratory safety symbols – Meaning:

Corrosive, carcinogenic, Harmful, toxic, dangerous to environment, Explosive, flammable, Narcotic, Oxidizing, Lachrymatory, Radioactive, irritant, gases under pressure, general laboratory safety precautions.

Unit-II: Environmental Chemistry:

Ambient air quality standards, Acid rain, Smog, Greenhouse effect, Bhopal gas tragedy, Vishakhapatnam polymer industry tragedy, Renewable and Nonrenewable energy resources, DO, COD, BOD, Toxicity of lead, mercury, arsenic and Cadmium.

Unit-III: Bioinorganic Chemistry:

Essential elements, biological significance of Na, K, Mg, Ca, Fe, Metalloporphyrin – Structure and functions of hemoglobin, Myoglobin.

Unit-IV: Biological functions of Hormones:

Introduction,Types of harmones, Role of Anderstrone, Progestrone and thyroxin, action of cortisone, Insulin.

Unit-V: Medicinal Chemistry:

The role of vitamins – K,E,D,C,B – complex, classification of antibiotics, mechanism of antibiotics action - role of ampicillin, chloromycetin and amoxicillin as antibiotics.

Text books/ Reference books:

1. Laboratory safety for Chemistry Students by Robert H. Hill and David Finster

2. A Text book of Environmental chemistry by W. Moore and F.A. Moore

3. Environmental Chemistry by Samir K. Banerji

4. Organic Chemistry by G. Mare Loudan, Purdue University

5. Unified Chemistry by O.P. Agarwal, Paper-III, JPNP Publications.

6. Hormones and Endocrine system – Kleine, Rossemanith.

7. Principles of Biochemistry-Leninger.

8. Essentials of Medical pharmacology- K. D. Tripathi.

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DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

III SEMESTER

Paper Code & Title: 22CH3L1: ORGANIC PREPARATIONS

Course: Organic Preparations(22CH3L1)		
S.No	COURSE OUTCOMES	PO`S
	The graduate will be able to	
1	Memorize the principle involved in various organic preparations.	2,7
2	Understand the mechanism involved in organic preparation.	1,2
3	Apply the knowledge of organic preparations in their chosen field.	3,4,6

1. Preparation of organic compounds: Three stage preparations by reactions involving nitration, halogenation, oxidation, reduction, alkylation, acylation, condensation and rearrangement. (A student is expected to prepare at least five different organic compounds by making use of the reactions given above).

2. Green Procedures for organic qualitative analysis and organic compound preparations (atleast 6 preparations).

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DEPARTMENT OF CHEMISTRY

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)

III SEMESTER

Paper Code & Title: 22CH3L2: MIXTURE ANALYSIS

Course: Mixture Analysis(22CH3L2)		
S.No	COURSE OUTCOMES	PO`S
	The graduate will be able to	
1	Get familiarized with the tests involved to identification of various functional groups.	2,7
2	Understand the theory involved in identification and separation of the given organic mixture based on the solubility	1,2,7
3	Apply the knowledge to identify various functional groups present in the given organic compound by following a systematic procedure.	3,4,6

Analysis of organic binary mixtures: Separation and identification of organic binary mixtures

(The students must be given training in at least 10 mixtures with different functional groups).

Note: For semester end examinations the student has to submit at least two solid derivatives for each individual component.

M.Sc. DEGREE EXAMINATION

THIRD SEMESTER

ORGANIC SPECTROSCOPY

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions. Each question carries 4 marks.
(5x4M=20M)

1.(a) Discuss Auxochromes in UV visible spectroscopy in short. (CO-2)

(Or)

(b) Explain Wood ward fieser rules. (CO-2)

2.(a) What is finger print region in IR Spectroscopy and discuss its importance O-3)

(Or)

(b) Discuss the mechanics of measurements in IR Spectroscopy in short (CO-2)

3.(a) Illustrate the basic principle of NMR spectroscopy. (CO-1)

(Or)

(b) What is chemical shift? Explain the significance of δ – scale. (CO-2)

4.(a) Elaborate the importance of nitrogen rule in Mass Spectrometry. (CO-2)

(Or)

(b) Explain the role EI technique in ionization of molecules. (CO-2)

5.(a) What is Stevenson's rule? (CO-1)

(Or)

(b) Write the list out the general modes of fragmentation. (CO-1)

SECTION – B

(10x5=50M)

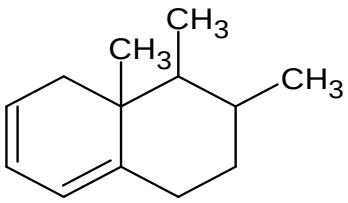
UNIT - I

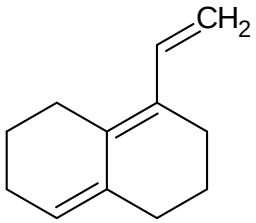
6.(a)Write a detailed note on i)Types of shifts in UV ii) Electronic transitions in UV.(CO-2)

(Or)

(b) Calculate the λ max of the following compounds (CO-4)

(i) (ii)





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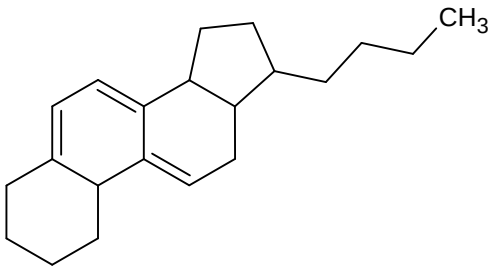

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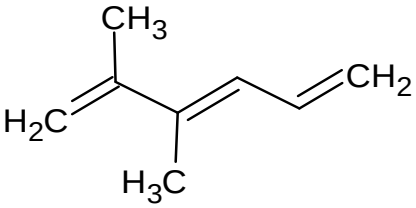


UNIT – II

7.(a) Write a note on i) fundamental modes of vibrations

ii) Factors effecting IR stretching frequency of organic compounds. (CO-3)

(Or)

(b) How will you distingwish o-hydroxybenzaldehyde and p-hydroxybenzaldehyde on the

basis of IR spectroscopy ii) How will you distinguish the following pairs by the use of

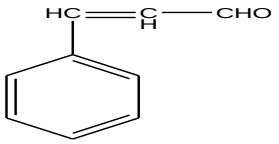
their IR spectra (i) CH_3CH_2CHO and CH_3COCH_3 (ii) CH_3CH2NH_2 and CH_3NHCH_3 (CO-3)

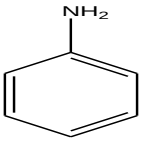
UNIT – III

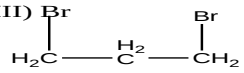
8. (a) Define Chemical shift. Give an account on Chemical exchange in NMR. (CO- 2)

(b) Predict the number of signals and their chemical shift in each of the following

compounds (CO-3)

I) 

II) 

III) 

(Or)

(c) A compound of Molecular weight 122, in its PMR Spectrum shows 1.4(T,3H) .0(Q,2H), 6.8-7.2(M,5H). Write structure of compound using above data. (CO-3)

(d) Explain the coupling constant in NMR and describe about various types of coupling constants (CO-2)

UNIT - IV

9.(a) The mass spectrum of an unknown compound shows a molecular ion peak at m/z =78 with a relative intensity of 23.6 and the relative intensities of the isotopic peaks are as follows m/z 79(1.00), 80(7.55), 81(.25) .what is the molecular formula of this unknown? (CO- 3)

(Or)

(b) what is the principle of mass spectrometry?. Discuss some quantitative and qualitative applications of mass spectrometry. (CO-2)

UNIT - V

10.(a) In the mass spectrum of 1-hexanol , a very weak molecular ion peak appears at m/z = 102 . Some other prominent peaks appear at m/z values of 100,99,84 56(base peak) and 31 . What are the most probable species responsible for the above mentioned peak positions. (CO-3)

(Or)

(b) How mass spectrum is useful to distinguish between 1^0,2^0,3^0 aliphatic amines? (CO- 4)

(c) Illustrate Mc Lafferty rearrangement with suitable examples (CO-2)

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M.Sc. DEGREE EXAMINATION

THIRD SEMESTER

ORGANIC REACTION & MECHANISMS

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions. Each question carries 4 marks.
(5x4M=20M)

1. (a) Discuss oxidations with HIO_4. (CO-2)

(Or)

(b) Define oxidation and discuss the various types of oxidations. (CO-1)

2. (a) Write notes on reduction with diimide. (CO-1)

(Or)

(b) Give the definition and mechanism of clemmenson's reduction. (CO-2)

3. (a) Discuss Dienone phenol rearrangement. (CO-1)

(Or)

(b) Write an account of Wolf rearrangement.
(CO-2)

4. (a) What are pericyclic reactions? Give the classification.
(CO-1)

(Or)

(b) Write the molecular orbital energy level diagram for 1,3 – Butadiene.
(CO-2)

5. (a) Write notes on energy transfer.
(CO-1)

(Or)

(b) Explain Barton reaction.
(CO-2)

SECTION – B

(5x10M=50M)

UNIT - I

6. (a) Explain oxidations with i) RuO_4 ii) SeO_2
(CO-3)

(Or)

(b) Explain oxidations with i) $KMnO_4$ ii) MnO_2
(CO-3)

UNIT – II

7. (a) Discuss Birch reduction of aromatic compounds.
(CO-2)

(Or)

(b) Discuss the reductions with $LiAlH_4$.
(CO-2)

UNIT – III

8. (a) Explain the following

i) Wagner Meerwein rearrangement ii) Benzil – Benzilic acid rearrangement.
(CO-2)

(Or)

(b) i) Baeyer Villiger rearrangement ii) Cumene hydroperoxide rearrangement.
(CO-2)

UNIT - IV

9. (a) Apply correlation method to 4nπ electrocyclic reaction for thermal and photochemical

conditions.
(CO-3)

(Or)

(b) Apply FMO method to 1,5 sigmatropic shift and write Woodward and Hoffmann rules

by PMO method.
(CO-3)

UNIT - V

10. (a) Discuss Norish type – I and type – II reactions.
(CO-2) **(Or)**

(b) Explain the following i) photochemistry of olefins ii) Di – π – methane rearrangement. (CO-2)

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M.Sc. DEGREE EXAMINATION

THIRD SEMESTER

ORGANIC SYNTHESIS

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions. Each question carries 4 marks.
(5x4M=20M)

1. a) What are acidic methylene groups? (CO-2)

(Or)

b) Explain about carbenes. (CO-1)

2. a) Discuss in short about syn elimination. (CO-1)

(Or)

b) Elaborate Wittig reaction with an example. (CO-2)

3. a) Describe dienophile with an example. (CO-1)

(Or)

b) What are lewis acids? Explain with an example. (CO-2)

4. a) Enumerate the significance of Disconnection approach in organic synthesis. (CO-2)

(Or)

b) Write a short note on synthon. (CO-1)

5. a) Discuss the role of functional group protection & deprotection in organic synthesis. (CO-2)

(Or)

b) Explain the importance of regioselective protection. (CO-2)

SECTION – B

(5x10M=50M)

UNIT - I

6. a) Explain enamine and related reactions.
(CO-2)

(Or)

b) Discuss in detail the synthetic applications of carbenes and carbenoids with examples. (CO-2)

UNIT – II

7. a) Write an account of reductive dimerisation of carbonyl compounds with examples. (CO-2)

(Or)

b) Discuss any three methods for the stereoselective synthesis of tri and tetra substituted alkenes.
(CO-2)

UNIT – III

8. a) What is Diels Alder reaction? Discuss the mechanism and stereochemistry.
(CO-2)

(Or)

b) Write note on 1,3 – dipolar cycloaddition reactions.
(CO-2)

UNIT - IV

9. a) Discuss the various methods of disconnection of alcohols.
(CO-3)

(Or)

b) Give an account of disconnections of 1,3 – dicarbonyl compounds.
(CO-2)

UNIT – V

10.a) Discuss about the protecting agents to protect the following functional groups

(i) AMINO group (ii) carboxylic acid. (CO-3)

(Or)

b) List out the reagents and apply them for the protection and deprotection of hydroxyl and carbonyl

groups.
(CO-3)

M.Sc. DEGREE EXAMINATION

THIRD SEMESTER

NATURAL PRODUCTS

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions. Each question carries 4 marks.
(5x4M=20M)

1. a) What are alkaloids? Explain. (CO-2)

(Or)

b) Discuss the general classification of alkaloids. (CO-1)

2. a) Discuss Isoprene rule. (CO-1)

(Or)

b) Write the structure of Zingiberine. (CO-2)

3. a) Write the synthesis of farnesol. (CO-2)

(Or)

b) Discuss the nomenclature of steroids. (CO-1)

4. a) Give a short notes on classification of flavonoids? (CO-1)

(Or)

b) Discuss the isolation of flavonoids and isoflavonoids. (CO-2)

5. a) Discuss the classification of natural pigments. (CO-1)

(Or)

b) Discuss the functions of carotenoids in plants. (CO-2)

SECTION – B

(10x5=50M)

UNIT - I

6. a) Outline the synthesis of Morphine. (CO-2)

(Or)

b) Discuss the various methods of degradation of alkaloids. (CO-2)

UNIT – II

7. a) Explain the structure elucidation of Zingiberene. (CO-2)

(Or)

b) Write notes on structure elucidation of farnesol. (CO-2)

UNIT – III

8. a) Establish the structure elucidation of Androsterone. (CO-3)

(Or)

b) Establish the structure of progesterone and write any one method of synthesis. CO-3)

UNIT - IV

9. a) Write structure elucidation of kaempferol. (CO-3)

(Or)

b) Write structure elucidation of Quercetin. (CO-3)

UNIT - V

10.a) Discuss the structure elucidation of α – carotene. (CO-3)

(Or)

b) Discuss the structure elucidation of β - carotene (CO-3)

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M.Sc. DEGREE EXAMINATION

THIRD SEMESTER

RETRO SYNTHETIC ANALYSIS

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions. Each question carries 4 marks.
(5x4M=20M)

1. a) Enumerate the significance of Disconnection approach in organic synthesis.
(CO-2)

(Or)

b) Write a short note on synthon.
(CO-1)

2. a) Discuss one group C - X disconnections of sulphides with suitable examples.
(CO-1)

(Or)

b) Discuss one group C - X disconnections of Ethers with suitable examples.
(CO-2)

3. a) Write notes on Michael addition.
(CO-2)

(Or)

b) Discuss the disconnection of Diels Alder reaction.
(CO-1)

4. a) Discuss the role of functional group protection & deprotection in organic synthesis.
(CO-1)

(Or)

b) Explain the importance of regioselective protection.
(CO-2)

5. a) Write notes on Robinson annelation.
(CO-1)

(Or)

b) Discuss the synthesis of any saturated heterocyclic compound.
(CO-2)

SECTION – B

(10x5=50M)

UNIT - I

6. a) Discuss the order of events in retro synthesis with respect to salbutamol & domapine.(CO-2)

(Or)

b) Write notes on chemioselectivity & regioselectivity. (CO-2)

UNIT – II

7. a) Discuss two group C – X disconnections of 1,3 – difunctionalised compounds. (CO-2)

(Or)

b) Discuss control in carbonyl condensations. (CO-2)

UNIT – III

8. a) Discuss the use of acetylenes and aliphatic nitro compounds in organic synthesis. (CO-3)

(Or)

b) Discuss 1,1-C - C, 1,2- C–C and 1,3- C – C carbonyl compounds. (CO-3)

UNIT - IV

9. a) Discuss about the protecting agents to protect the following functional groups (i) AMINO group (ii) carboxylic acid. (CO-3)

(Or)

b) List out the reagents and apply them for the protection and deprotection of hydroxyl and carbonyl groups. (CO-3)

UNIT - V

10. a) Discuss the synthesis of 5 and 6 membered rings. (CO-3)

(Or)

b) Discuss the synthesis of 3 and 4 membered rings. (CO-3)

M.Sc. DEGREE EXAMINATION

THIRD SEMESTER

OPEN ELECTIVE – POLYMER CHEMISTRY

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions. Each question carries 4 marks.
(5x4M=20M)

1. a) *Discuss about classification of polymers.* *(CO-1)*

(or)

b) Explain one polymerization reaction which involves free radical mechanism. (CO-2)

2. a) Give a short account on isolation of polymers. (CO-1)

(or)

b) Describe the purification method of polymers. (CO-1)

3. a) What is hydrolysis? Explain with an example. (CO-2)

(or)

b) What is cross – linking reaction? Explain its impact. (CO-2)

4. a) List out the types of degradation methods. (CO-1)

(or)

b) Explain ultrasonic waves degradation with an example. (CO-2)

5. a) What are elastomers? Explain in brief. (CO-2)

(or)

b) Discuss the method for the synthesis of polystyrene. (CO-2)

SECTION – B

(10x5=50M)

UNIT - I

6. a) Explain in detail about cationic polymerization with suitable examples. (CO-2)

(Or)

b) Give a detailed account on Graft and Block copolymers. (CO-2)

UNIT – II

7. a) Discuss in detail about molecular weight determination. (CO-2)

(Or)

b) Explain elaborately about various processing techniques. (CO-2)

UNIT – III

8. a) Illustrate the following with suitable examples (i) Aminolysis (ii) Cyclisation reactions. (CO-2)

(Or)

b) Write an account on addition & substitution reactions with suitable examples. (CO-2)

UNIT – IV

9. a) Describe the following degradation methods with suitable examples

(i) Thermal degradation (ii) Photo degradation (CO–2)

(Or)

b) Discuss the significance of oxidative degradation and hydrolytic degradation. (CO–2)

UNIT – V

10. a) Give an account on the following (i) Polyacrylonitrile (ii) Polyurethanes (CO–2)

(Or)

b) Elaborate the following in detail (i) Epoxy polymers (ii) Silicon polymers (CO-2)

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M.Sc. DEGREE EXAMINATION

SECOND SEMESTER

OPEN ELECTIVE – BASIC BIO CHEMISTRY

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions. Each question carries 4 marks.
(5x4M=20M)

1. (a) What precautions are to be taken while handling carcinogenic chemicals? (CO-2)

(Or)

(b) Define toxicity. List out few examples of toxic chemicals. (CO-1)

2.(a) Explain Ambient air quality standards in short. (CO-1)

(Or)

(b) Discuss Acid rain in Brief. (CO-2)

3.(a) What are essential elements? Mention few examples. (CO-1)

(Or)

(b) Porphyrin ligand is macro cyclic ligand. Explain. (CO-2)

4.(a) Write importance of insulin. (CO-1)

(Or)

(b) Write importance of thyroxin. (CO-1)

5. (a) Discuss briefly the uses of K vitamin. (CO-1)

(Or)

(b) Discuss the role of amoxicillin. (CO-1)

SECTION – B

(10x5=50M)

UNIT - I

6. (a) Give a detailed account on general laboratory precautions. (CO- 2)

(Or)

(b) Explain the measures to be taken up in handling the following types of chemicals

Radioactive ii) Lachrymatory (CO-2)

UNIT – II

7.(a) Describe the following in detail (i) Greenhouse effect (ii) Bhopal gas tragedy (CO-2)

(Or)

(b) Discuss the following in detail (i) Vishakhapatnam polymer industry tragedy

(ii) Renewable and Nonrenewable energy resources (CO-1)

UNIT – III

8. (a) Discuss the structure and role of hemoglobin as an oxygen carrier. (CO-2)

(Or)

(b) Elaborately explain about sodium and potassium pump. (CO-2)

UNIT - IV

9. (a) Explain different types of harmones. (CO-1)

(Or)

(b) Role of progesterone in human body. (CO-2)

UNIT - V

10.(a) Discuss the role of vitamin – D in a human body. (CO-1)

(Or)

(b) Discuss the classification of antibiotics and mention their general rules. (CO-2)

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