POCH 101

Department of Chemistry

SRR & CVR Govt.Degree College(A), Vijayawada

M.Sc., CHEMISTRY (ORGANIC CHEMISTRY) I SEMESTER

Paper Code & Title: 20 OCH 101: GENERAL CHEMISTRY-I

No. of hours per week: 04
Total marks: 100

Total credits: 04
(Internal: 40 M & External: 60M)

Course Learning Objective(S): The main objective of this paper is to give a knowledge for students on Titrimetric Analysis, Treatment of analytical data, Adsorption, Partition, Gas Chromatography and High-Performance Liquid Chromatography.

Unit-I: Titrimetric Analysis: Classification of reactions in titrimetric analysis- Primary and secondary standards- Neutralization Titrations-Theory of neutralization indicators-Mixed indicators Displacement titrations. Precipitation titrations-Indicators for precipitation titrations-Volhard's method-Mohr's method-**Fajans rule**. Oxidation reduction titrations-Change of electrode potentials during titration of Fe (II) with Ce (IV)- Detection of end point in redox titrations-Complexometric titrations-**EDTA**

Unit-II: Treatment of analytical data: Accuracy and precision- Classification of errors- Determinate and Indeterminate errors- Minimization of errors- Absolute and Relative errors, propagation of errors- Gaussian distribution- Measures of central tendency-Measures of precision- Standard deviation- Standard error of mean- student's t- test- Testing for significance- F-test- Criteria of rejection of an observation- Significant figures.

Unit-III: Methods of purification: 1. Distillation: Basic principles, Distillation types- continuous distillation, batch distillation, fractional distillation, vacuum distillation and steam distillation.
2. Drying Techniques: Drying of Hexane, Benzene, Toluene, Xylene, Tetrahydrofuran, DMF, DMSO, Methanol, Ethanol, Diethyl ether and Dioxane;
3. Solvent extraction: Basic principles, Different types of extraction. Selection of solvents. Basic concepts on Soxhlet extraction.
4. Recrystallization: Basic principles, choice of solvent, seeding, filtration and centrifugation and drying..

Unit-IV: Adsorption and Partition Chromatography: Introduction to chromatography, Different types of Chromatography:
Adsorption chromatograph: adsorbents, solvents, solutes, apparatus;
Column Chromatography: stationary phase, Mobile phase, packing of column, advantages and disadvantages.

POCH 101

Paper chromatography: Basic Principles. Ascending and descending types. Selection of mobile phase. Development of chromatograms. Application of paper chromatography in the identification of sugars and amino acids. One- and two-dimensional paper chromatography;

Thin Layer chromatography: Basic Principles. Common stationary phases, Methods of preparing Methods of preparing TLC plates, Development of TLC plate, Rf value. Application of TLC in monitoring organic reactions.

Unit-V: Gas Chromatography and High-Performance Liquid Chromatography: Gas chromatography: Basic Principles. Different types of GC techniques. Selection of columns and carrier gases. Instrumentation. detectors; RT values. Applications in the separation.

High Performance liquid chromatography (HPLC): Basic Principles. Normal and reversed Phases. Selection of column and mobile phase. Instrumentation. detectors; RT values. Applications in the separation.

Course Learning Outcome(S): After studying this paper, students will acquire the knowledge of Titrimetric Analysis, Treatment of analytical data, Adsorption, Partition, Gas Chromatography and High-Performance Liquid Chromatography.

Text books/ Reference books:

1. Vogel's text book of quantitative analysis. Addition Wesley Longmann Inc.
2. Quantitative analysis R.A Day and A.L. Underwood. Prentice Hall Pvt. Ltd.
3. Principles of Instrumental Analysis by D. A. Skoog, F. J. Holler and T. A. Nieman, Harcourt College Pub.
4. Separation Techniques by M. N. Sastri, Himalaya Publishing House (HPH), Mumbai.
5. Chromatography, E. Helftnan, Van Nostrand, Reinhold, New York.
6. Chromatography, E. Lederer and M. Lederer, Elsevier, Amsterdam.
7. Thin layer chromatography, E. Stahl, Academic Press, New York.
8. Introduction to Organic Laboratory Techniques-D. L. Pavia, G. M. Lampman, G. S. Kriz and R. G. Engel, Saunders College Pub (NY).
9. Instrumental methods of Chemical Analysis by H. Kaur, Pragati Prakasan, Meerut.
10. Protein Purification-Principles and practice, III Edn- R. K. Scopes, Narosa Publishing House, Delhi

V. Bhuvaneswari

P. Rampami

D. Headle

I/C-Chairman V. Veeraju

M. Jyothi

MODEL QUESTION PAPER pOCH 101

Class: I M.Sc Organic chemistry **Semester I**
Paper:General chemistry I **Code:20 OCH101**
Time:3 HrsMax.Marks: 60M

PART-A

I.Answer any 5 questions out of the 10 short answer questions **5x4=20 Marks**

1.Write a note on Neutralisation indicators

2.Explain EDTA titrations

3.Explain T-test and F-test

4.Define Accuracy and precision

5.Write a note on drying agents Benzene and Ethanol

6.Write a note on Filtration and Centrifugation

7.Write a note on advantages and disadvantages of Column chromatography

8.Write applications of Paper chromatography

9.Explain basic principles of Gas chromatography

10.Explain reverse phase HPLC

PART-B

II.Answer any 5 questions out of the 10 internal choice essay questions **5x8=40 Marks**

UNIT-I

11.Expalin the Classification reactions in titrimetry?

(OR)

12.Write a note on Mohr's method and Volhard's method?

UNIT-II

13.Define an error? Explain the classification of errors with suitable examples?

(OR)

14.Write a note on Gaussian distribution curve?

UNIT-III

15. Discuss the basic principle and working of Steam distillation.?

(OR)

16.Write a note on continuous distillation?

UNIT-IV

17. Explain types of paper chromatography?

(OR)

18.Explain the applications of TLC?

UNIT-V

19.Explain the basic principles and instrumentation of HPLC?

(OR)

20.Explain the detectors used in GC?

V.O P.Kumari D.Madhu V.Neeraja K.Kumar H.Jyothi

POCH 102

Department of Chemistry

SRR & CVR Govt.Degree College(A), Vijayawada

M.Sc., CHEMISTRY (ORGANIC CHEMISTRY) I SEMESTER

Paper Code & Title: 20 OCH 102: ORGANIC CHEMISTRY-I

No. of hours per week: 04
Total marks: 100

Total credits: 04
(Internal: 40 M & External: 60M)

Course Learning Objective(S): The main objective of this paper is to give a basic and updated knowledge for students on Nature of bonding, Aromaticity and organic reaction mechanism.

Unit-I: Nature of bonding and Aromaticity: Nature of bonding: Inductive effect, Mesomeric effect (Resonance), conjugation, cross conjugation, Hyperconjugation,**Aromaticity:** Aromaticity in benzenoid non-benzenoid compounds, Tropyllium cation, 1,3,5,7- Cyclooctatetraene, aromaticity of Hetero-aromatic Systems, Annulenes:[10] Annulenes- [12], [14],[16] and [18] annulenes, azulenes, anti-aromaticity and homo-aromaticity.

Unit-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, Enophiles.

Unit-III: Addition Reactions: Addition reactions involving electrophiles, nucleophiles and free radicals, regio and chemo selectivity, Hydrogenation of double and triple bonds, hydrogenation of aromatic rings, Hydroboration.

Unit-IV: Elimination Reactions: Type of elimination reactions, mechanisms, Stereochemistry of Hofmann and Saytzeff rules, Syn elimination versus anti-elimination, elimination and substitution, dehydration, dehydrogenation, dehalogenation, decarboxylative eliminations.

Unit-V: Substitution Reactions: Aliphatic Nucleophilic Substitution Reactions: The S_N2, S_N1, mixed S_N1 and S_N2 reactions and their mechanisms, sigma and pi bonds.
Aromatic Nucleophilic substitution Reactions: S^2 (Ar) (Addition–Elimination), S_{NI}(Ar) and benzyne mechanisms (Elimination - Addition); Von Richter, Sommelet-Hauser rearrangements.

Course Learning Outcome(S): After studying this paper, students will acquire the knowledge of Nature of bonding, Aromaticity and organic reaction mechanism

V. Durga Rao
P. Kumari
D. Radha
C. Chandrakumar
V. Veeraiah
M. Jyothi

Text books / 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, 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.

POCH102

MODEL QUESTION PAPER

Class: I M.Sc Organic chemistry **Semester I**

Paper :Organic chemistry I **Code:20 OCH102**

Time:3 HrsMax.Marks: 60M

PART-A

I.Answer any 5 questions out of the 10 short answer questions **5x4=20 Marks**

1. Write a note on azulenes
2. Explain the aromaticity of annulenes
3. Write the generation and reactivity of carbenes
4. Explain generation and reactivity of Arynes
5. Write a note on homogeneous catalytic hydrogenation of alkenes.
6. Explain hydroboration reaction with mechanism
7. Write a note on syn elimination versus anti elimination
8. Explain Hofmann elimination with suitable examples.
9. Write a note on SommeletHauser rearrangement
10. Write a short note on Vonrichter rearrangement

PART-B

II.Answer any 5 questions out of the 10 internal choice essay questions **5x8=40 Marks**

UNIT-I

11. Expalin the aromaticity of non benzenoid compounds

(OR)

12. Write a note on anti aromaticity and homo aromaticity

UNIT-II

13. Explain generation, structure ,stability, detection and reactivity of carbocations

(OR)

14. Write the generation and reactivity of carbanions

UNIT-III

15. Write a note on hydro halogenation of alkenes

(OR)

16. Discuss halogenation of alkenes.

UNIT-IV

17 .Explain the mechanism of E1 and E2 eliminations.

(OR)

18. Explain Hoffmann eliminations with suitable examples.

UNIT-V

19. Explain benzyne mechanism

(OR)

20. Explain S_N1, S_N2 reactions with mechanisms

V. Dharma

P. Kompani

D. Madhu

V. Narayana

K. Ashok Kumar

M. Jyothi

POCH 103

Department of Chemistry

SRR & CVR Govt.Degree College(A), Vijayawada

M.Sc., CHEMISTRY (ORGANIC CHEMISTRY) I SEMESTER

Paper Code & Title: 20 OCH 103: INORGANIC CHEMISTRY-I

No. of hours per week: 04
Total marks: 100

Total credits: 04
(Internal: 40 M & External: 60M)

Course Learning Objective(S): The main objective of this paper is to give a basic and updated knowledge for students on Introduction to Exact Quantum Mechanical Results, Chemistry of non-transition elements, Structure & Bonding, Metal-ligand bonding, and Metal – ligand Equilibria in solutions.

Unit-I: Introduction to Exact Quantum Mechanical Results: Schrodinger equation, importance of wave function, Operators, Eigen values and Eigen functions, 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. Application of variation method to the Hydrogen atom.

Unit-II: Chemistry of non- transition elements: Inter halogen compounds, Halogen oxides 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.

Unit-III: Structure and Bonding: pπ-dπ bonding, Bent's rule, VSEPR theory, Molecular Orbital theory, Symmetry of Molecular orbitals, 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.

Unit-IV: Metal–ligand bonding: Crystal Field Theory of bonding in transition metal complexes-Splitting of d-orbitals in octahedral, tetrahedral, square planar and Trigonal bipyramidal and Square pyramidal fields. Tetragonal distortions - Jahn-Teller effect. Applications and limitations of CFT. Molecular Orbital Theory of bonding for Octahedral, tetrahedral and square planar complexes.

Unit-V: Metal – ligand Equilibria in solutions: Step wise and over all formation constants. Determination of formation constants by Spectrophotometric method (Job's method) and pH metric method (Bjerrum's). Stability correlations - Irving -William's series. Hard and soft acids and bases (HSAB).Acid-basestrengths.

Course Learning Outcome(S): After studying this paper, students will acquire the knowledge of Introduction to Exact Quantum Mechanical Results, Chemistry of non- transition elements, Structure & Bonding, Metal–ligand bonding, and Metal – ligand Equilibria in solutions.

Text books/ 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. Daniel, oxford Press.
7. Introductory quantum Mechanics, A. K. Chandra.
8. Quantum Chemistry, R. K. Prasad.
9. Inorganic Chemistry, Atkins, ELBS.
10. Advanced Inorganic Chemistry, Cotton and Wilkinson, Wiley Eastern.
11. Text book of Coordination chemistry, K. Somasekhara Rao and K.N.K. Vani, Kalyani Publishers.

POCH 103

MODEL QUESTION PAPER

Class: I M.Sc Organic chemistry
Paper: Inorganic chemistry I
Time:3 Hrs Max.Marks: 60M

Semester I
Code:20 OCH103

PART-A

I.Answer any 5 questions out of the 10 short answer questions **5x4=20 Marks**

1.Explain the importance of wave function.

2. Write a short note on Eigen values and Eigen functions.

3.Write a shot notes on interhalogen compounds

4.Explain the properties and structure of S-N complexes.

5.Explain molecular orbital diagram for NO_2^- ion.

6.Explain pπ-dπ bonding

7.Write the splitting of d-orbitals in trigonal bipyramidal cpomplexes.

8. Explain molecular orbital theory.

9.Explain step wise and overall formation constants.

10.Explain Irving William series.

PART-B

II.Answer any 5 questions out of the 10 internal choice essay questions **5x8=40 Marks**

UNIT-I

11.Derive Schrödinger wave equation.

(OR)

12 Explain variation theorem,Applicatio of variation method to H-atom

UNIT-II

13.Write a note on dioxygen complexes.

(OR)

14. Describe the spectral and magnetic properties of Lanthanides and Actinides

UNIT-III

15.What are Walsh diagram? Predict the shape of H_2O molecule using relevant Walsh diagrams?

(OR)

16. Write an account on Bent's rule, energetics of hybridisation

UNIT-IV

17. Explain Jahn-Teller effect with suitable examples.

(OR)

18. Explain molecular orbital theory of bonding in octahedral complexes

UNIT-V

19.Determine the formation concept by spectroscopic method.

(OR)

20.Explain Hard and Soft Acid base theory.

P. Kumpani

POCH 103

MODEL QUESTION PAPER

Class: I M.Sc Organic chemistry
Paper:Inorganic chemistry I
Time:3 HrsMax.Marks: 60M

Semester I
Code:20 OCH103

PART-A

I.Answer any 5 questions out of the 10 short answer questions **5x4=20 Marks**

1.Explain the importance of wave function.

2. Write a short note on Eigen values and Eigen functions.

3.Write a shot notes on interhalogen compounds

4.Explain the properties and structure of S-N complexes.

5.Explain molecular orbital diagram for NO_2^- ion.

6.Explain pπ-dπ bonding

7.Write the splitting of d-orbitals in trigonal bipyramidal cpomplexes.

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UNIT-I

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15.What are Walsh diagram? Predict the shape of H_2O molecule using relevant Walsh diagrams?

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16. Write an account on Bent's rule, energetics of hybridisation

UNIT-IV

17. Explain Jahn-Teller effect with suitable examples.

(OR)

18. Explain molecular orbital theory of bonding in octahedral complexes

UNIT-V

19.Determine the formation concept by spectroscopic method.

(OR)

20.Explain Hard and Soft Acid base theory.

POCH 104

Department of Chemistry

SRR & CVR Govt.Degree College(A), Vijayawada

M.Sc., CHEMISTRY (ORGANIC CHEMISTRY) I SEMESTER

Paper Code & Title: 20 OCH 104: PHYSICAL CHEMISTRY-I

No. of hours per week: 04
Total marks: 100

Total credits: 04
(Internal: 30 M & External: 70M)

Course Learning Objective(S): The main objective of this paper is to give a basic and updated knowledge for students on Thermodynamics, Surface phenomena and phase equilibria, Electrochemistry. Chemical kinetics and Microwave Spectroscopy and Rotational Vibrational Spectroscopy.

Unit-I: Thermodynamics–I: Classical thermodynamics - Brief review of first and second laws of thermodynamics - Entropy change in reversible and irreversible processes - Entropy and disorder – Free energy functions - Gibbs-Helmholtz equation - Maxwell partial relations. Free energy changes in chemical reactions. Van't Hoff reaction isotherm - Van't Hoff equation – Classiuss - Clapeyron equation - partial molar quantities - Chemical potential - Gibbs- Duhem equation - partial molar volume - determination of partial molar quantities - Fugacity - Thermodynamic derivation of Raoult's law.

Unit-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 - Auger electron spectroscopy. **Surface active agents** - classification of surface-active agents - Micellization – critical Micelle concentration (CMC) - factors affecting the CMC of surfactants, Micro emulsions - Reverse micelles.

Unit-III: Electrochemistry-1: Electrochemical cells - Measurement of EMF - Nernst equation – Equilibrium constant from EMF Data - pH and EMF data -Determination of solubility product from EMF measurements. Concentration cells with and without transference – Liquid junction potential and its determination - Activity and activity coefficients - Debye Huckel limiting law and its verification. - Anomalous behavior of strong electrolytes. Debye Huckel-Onsagar equation - verification and limitations

Unit-IV: Chemical kinetics: Methods of deriving rate laws - complex reactions - Theories of reaction rates -collision theory - Steric factor - Activated complex theory - Thermodynamic aspects - Unimolecular reactions - Lindemann's theory - Lindemann-Hinshelwood theory. Primary and secondary salt effects. Elementary account of linear free energy relationships

V. Chandrasekhar

M. Jyothi

P. Kuppan

D. Madhavi

K. Ramakrishnan

V. Narasaraju

POCH 104

equation - Chain reactions - Rate laws of H_2-Br_2, photochemical reaction of H_2 - Cl_2. Decomposition of acetaldehyde and ethane

Unit-V: Microwave Spectroscopy and Rotational Vibrational Spectroscopy: Motion of molecules-Degrees of freedom –Energy associates with the degrees of freedom Type of spectra. **Microwave spectroscopy**: Classification molecules, rigid rotator model, non-rigid rotator-Microwave spectra of polyatomic molecules. **Rotational Vibrational Spectroscopy**: Harmonic oscillator, vibrational energies of diatomic molecules, zero-point energy, force constant and bond strengths, anharmonicity Morse potential energy diagram. Vibration – rotation spectroscopy. PQR branches, Born–Openheimer approximation, selection rules, normal modes of vibration group frequencies, overtones, hot bands.

Course Learning Outcome(S): After studying this paper, students will acquire the knowledge of Thermodynamics, Surface phenomena and phase equilibria, Electrochemistry, Chemical kinetics and Microwave Spectroscopy and Rotational Vibrational Spectroscopy.

Text books / Reference books:

1. Physical Chemistry P.W. Atkins, ELBS.
2. Chemical Kinetics - K.J. Laidler, McGraw Hill Pub.
3. Text Book of Physical Chemistry. Samuel Glasstone, Mcmillan Pub.
4. Physical Chemistry, G.W. Castellan. Narosa Publishing House
5. Thermodynamic for Chemists. Samuel Glasstone.
6. Electrochemistry, Samuel Glasstone, Affiliated East West
7. Physical Chemistry, W.J. Moore, Prentice Hall
8. Atomic structure and chemical bond. Manaschanda. Tata McGraw Hill Company Limited.
9. Fundamentals of Molecular spectroscopy: by C.N. Banwell
10. Molecular spectroscopy by B.K. Sharma
11. Vibrational Spectroscopy by D.N. Satyanarayana New Age Int. Pub.
12. Spectroscopy by Aruldas.

POCH 104

MODEL QUESTION PAPER

Class: I M.Sc Organic chemistry
Paper:Physical chemistry I
Time:3 HrsMax.Marks: 60M

Semester I
Code:20 OCH104

PART-A

I.Answer any 5 questions out of the 10 short answer questions **5x4=20 Marks**

1 Explain Entropy change in reversible process.

2.Discuss First and Second law thermodynamics

3.Derive young laplace equation.

4.Define Critical Micelle Concentration and explain the factors affecting CMC

5.Derive Nernst equation.

6. Explain liquid junction potential and its determination.

7.Derive rate law for the thermal decomposition of Acetaldehyde

8.Explain rate laws of photochemical reaction of $H_2 - Cl_2$.

9. Write a note on classification of molecules.

10. Write a note on overtone and hot bands.

PART-B

II.Answer any 5 questions out of the 10 internal choice essay questions **5x8=40 Marks**

UNIT-I

11.Derive Van't Hoff's equation

(OR)

12.Derive the Gibbs Duhem Equation

UNIT-II

13.Derive BET equation.

(OR)

14. Explain the classification of surface-active agents

UNIT-III

15.What is concentration cells and calculate the potential of concentration cells with transference.

(OR)

16. Write a note on Debye Huckle Onsagar Equation, its verification and its limitations

UNIT-IV

17. Explain Lindemann theory of Uni molecular reaction rate

(OR)

18. Explain primary and secondary salt effects

UNIT-V

19.Describe the rotational spectra of a diatomic molecule as rigid rotor.

(OR)

20.Explain the vibrational spectra of harmonic oscillator

V.Veeraiah P.Kuppan M.Jyothi

Department of Chemistry

SRR & CVR Govt.Degree College(A), Vijayawada

M.Sc., CHEMISTRY (ORGANIC CHEMISTRY) I SEMESTER

Paper Code & Title: 20 OCH 105: ORGANIC CHEMISTRY PRACTICAL-I

No. of hours per week: 04
Total marks: 100

Total credits: 04
(Internal: 40 M & External: 60M)

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. Column chromatography - separate the given mixture of o-and p-nitro aniline.
8. Paper chromatography - separate the given mixture of sugars or amino acids.
9. Thin layer chromatography - separate the given mixture of phenols or 2,4-DNP derivatives of carbonyls compounds.
10. Preparation of Sodium wire - to make Sodium Wire for solvent drying.
11. Preparation of Sodium Granules.
12. Preparation of Sodium t-butoxide.
13. Preparation of Grignard Reagent and its usage one reaction.
14. Preparation of Wittig reagent.
15. Preparation of Butyl Lithium.

Course Learning Outcome(S): After studying this paper, students will acquire the practical knowledge on organic chemistry practical.

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.

Department of Chemistry
SRR & CVR Govt. Degree College(A), Vijayawada

M.Sc., CHEMISTRY (ORGANIC CHEMISTRY) I SEMESTER

Paper Code & Title: 20 OCH 106: INORGANIC CHEMISTRY PRACTICAL-I

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

Total marks: 100 **(Internal: 40 M & External: 60M)**

Course Learning Objective(S): The main objective of this paper is to give a practical knowledge for students on Inorganic experiments.

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 chromium (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 Copper using ammonium thio cyanate.
11. Gravimetric determination of Zn using diammonium hydrogen phosphate.
12. 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} ,Cl^-, Br^-, I^-, CH_3COO^-, $C_2O_4^{2-}$, $C_4H_4O_6^{2-}$, PO_4^{3-}, CrO_4^{2-}, BO_3^{3-}, SO_4^{2-}

Cations: Ammonium (NH_4^+)

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

2nd group: Hg^{+2}, 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}, Ti^{+4}, Zr^{+4}, VO^{+2}, UO_{2-2}, 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^+.

Course Learning Outcome(S): After studying this paper, students will acquire the practical knowledge of Inorganic experiments.

Text books/ Reference books:

1. Vogels Text Book of Quantitative analysis, revised. J. Bassett, R.C. Denny, G.H. Jeffery and J. Mendhan, ELBS.
2. Synthesis and Characterization of Inorganic Compounds, W.L. Jolly. Prentice Hall.
3. Practical Inorganic Chemistry by G. Pass and H. Sutcliffe Chapman and Hall.
4. Practical Inorganic Chemistry by. K. Somasekhara Rao and K.N.K. Vani. Kalyani publishers.

P. Kumari. M. Jyothi V. Neeraja

II semester Syllabus

Department of Chemistry

SRR & CVR Govt. Degree College(A), Vijayawada

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY) II SEMESTER

Paper Code & Title: 20 OCH 201: ORGANIC SPECTROSCOPY

No. of hours per week: 04
Total marks: 100

Total credits: 04
(Internal: 40 M & External: 60M)

Course Learning Objective(S): The main objective of this paper is to give a basic and updated knowledge for the students on UV-Visible spectroscopy, Infrared spectroscopy, ^{1}HNMR Spectroscopy and Mass spectrometry.

Unit-I: UV-Visible spectroscopy: Beer-Lambert's law-Deviations from Beers law- Instrumentation-Energy transitions– Simple chromophores- Auxochrome, Absorption shifts (Bathochromic, Hypsochromic, Hyper chromic and Hypo chromic shifts) UV absorption of Alkenes-Polyenes unsaturated cyclic systems. UV absorption of carbonyl compounds: α, β-unsaturated carbonyl systems-UV absorption of aromatic systems-solvent effects- geometrical isomerism-acid and base effects-typical examples-calculation of λmax values using Woodward- Fieser rules, applications.

Unit-II: Infrared 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: ^{1}H-NMR Spectroscopy-I: Introduction: Basic principle of NMR, Nuclear spin, nuclear resonance, saturation, Relaxation, Instrumentation. Shielding and deshielding of magnetic nuclei, chemical shift and its measurements, factors influencing chemical shift, spin-spin interactions, factors influencing – coupling constant J and factors effecting J value.

Unit-IV: ^{1}H-NMR Spectroscopy-II: Improving the PMR spectrum: Chemical and Magnetic Equvalence. Chemical exchange, analysis of AB, AMX and ABX systems. **Simplification of complex spectra:** Nuclear Magnetic double resonance, Lanthanide shift reagents, solvent effects, Fourier transforms technique, Nuclear Overhauser Effect (NOE).

Unit-V: Mass spectrometry: Introduction, Ion production-E1, C1, ES, MALDI and FAB- determination of Molecular weight and formulae-Behavior of organic compounds in mass spectrometer- factors affecting fragmentation. Mass spectral fragmentation of organic compounds, Common functional groups, molecular ion peak, meta stable peak, Mc Lafferty rearrangement, Nitrogen rule.

V. Durga Rao
P. Kuppan
M. Jyothi
D. Madhavi
K. Hari Krishna
V. Neeraja

Course Learning Outcome(S): After studying this paper, students will acquire the knowledge of UV-Visible spectroscopy, Infrared spectroscopy, ^{1}H-NMR Spectroscopy, ^{13}C- NMR Spectroscopy, and Mass spectrometry.

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.

MODEL QUESTION PAPER

Class: II M.Sc Organic chemistry
Paper:Organic spectroscopy
Time:3 HrsMax.Marks: 60M

Semester I
Code:20 OCH201

PART-A

I.Answer any 5 questions out of the 10 short answer questions **5x4=20 Marks**

1.Explain types of electronic transitions
2.Write a note on auxochromes and chromophores
3.Write about solvent effect on IR spectroscopy
4.Write a short note on the finger print region.
5.Explain basic principle of NMR.
6.Explain shielding and deshielding of magnetic nuclei.
7.Explain the complex PMR spectra of ABX and AMX systems.
8.Explain Nuclear overhauser Effect (NOE).
9.Explain the mass fragmentation pattern in Aromatic compounds.
10.Explain the mass fragmentation pattern in Aldehydes

PART-B

II.Answer any 5 questions out of the 10 internal choice essay questions **5x8=40 Marks**

UNIT-I

11.Write Wood-Ward Fieser rules for carbonyl compounds
(OR)
12. Write aboutTypes of absorption shifts

UNIT-II

13.How would you distinguish the following sets of compounds using IR spectra.
a) primary, secondary and tertiary amines
b) cis and trans cinnamic acid
(OR)
14 Write a note on fundamental modes of vibration.

UNIT-III

15. Define chemical shift and explain factors effecting chemical shift?
(OR)
16.Define coupling constant and explain factors effecting coupling constants

UNIT-IV

17 .Write a note on nuclear magnetic double resonance.
(OR)
18. Write a note on Chemical shift reagents.

UNIT-V

19.Write briefly about the ionization techniques EI and CI in mass spectroscopy
(OR)
20.Expalin MC Lafferty rearrangement with an example.

V. Neeraja
M. Jyothi

Department of Chemistry

SRR & CVR Govt. Degree College(A), Vijayawada

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY) II SEMESTER

Paper Code & Title: 20 OCH 202: ORGANIC CHEMISTRY -II

No. of hours per week: 04
Total marks: 100

Total credits: 04
(Internal: 40 M & External: 60M)

Course Learning Objective(S): The main objective of this paper is to give a basic and updated knowledge for the students on Named reactions, Stereo Chemistry, Green chemistry & Phase transfer catalysis and Chemistry of Nanomaterials.

Unit-I: Named reactions: Definition, mechanism of Aldol condensation, Benzoin condensation, Cannizzaro condensation, Perkin condensation, Mannich reaction, Reimer-Tiemann reaction, Shapiro reaction, McMurray reactionClemmensen reduction reaction, Wolff-Kishner reduction reaction, Meerwein– Ponndorf–Veriey reduction reaction, Birch reduction reaction, Robinson ring annulation reaction and Simmon-Smith reaction.

Unit-II: Stereo Chemistry-I: Concept and Recognition of Molecular Symmetry and Chirality. Definition and classification of Stereoisomers, Enantiomer, Diastereomer, Homomer, Epimer, Anomer, Configuration and Conformation, Configurational nomenclature: D,L and R, S nomenclature. Molecular representation of organic molecules: Fischer, Newman and Sawhorse projections and their inter-conversions. Geometrical Isomerism. Cis-trans, E, Z- and Syn and anti nomenclature, Cis-trans inter conversion.

Unit-III: Stereo Chemistry-II: Definition of Conformation and factors influencing on stability of Conformations; Conformational analysis and energy profile diagram of acyclic molecules; Conformational analysis of cyclic molecules - cyclobutane, cyclopentane, cyclohexane - mono and disubstituted cyclohaxanes and carbon hetero atom bonds having C–O & C–N.

Unit-IV: Green chemistry & Phase transfer catalysis: Introduction to Green chemistry, Principles and concepts of Green chemistry, Green Catalysis, Biocatalysis, renewable resources, Green Reagents. examples of green reactions Clean Fischer-Indole synthesis. Introduction to Microwave organic synthesis- introduction, advantages and disadvantages, solvents (water and organic solvents), solvent free reactions,

Unit-V: Chemistry of Nanomaterials: Introduction, carbon nanotubes: structure of single and multi-walled carbon nanotubes, synthesis-solid and gaseous carbon source-based production techniques, Growth mechanism of carbon nano tubes-catalyst free growth, catalyst activated growth, properties-general, adsorption, electronic and optical, Mechanical and reactivity.Applications

Course Learning Outcome(S): After studying this paper, students will acquire the knowledge of Named reactions, Stereo Chemistry, Green chemistry & Phase transfer catalysis and Chemistry of Nanomaterials.

P. Kumari V. Nagaraju M. Jyothi

Text books:

1.Advanced organic chemistry –Reaction, mechanism and structure, Jerry March, John Wiley.
2.A guide book to Mechanism in organic chemistry, Peter Sykes, Longman.
3.Organic chemistry, I.L. Finar, Vol. I & II, Fifth ed. ELBS, 1975.
4.Stereo Chemistry of carbon compounds – E.L. Eliel.
5.Nano, The Essentials: T. Pradeep, The Mc. Graw Hill & Co.
6.Principles of organic synthesis, R.O.C. Norman and J.M. Coxon, Blakie Academic & Professional.
7.Reaction Mechanism in organic chemistry, S.M. Mukherji and S.P. Singh, Macmillan.
8.Green chemistry Theory and Practice by Paul T. Anastas and John C. Warner, Oxford University press.
9.Methods and reagents for Green chemistry, PietroTundo, AlvisePerosa, FulvioZecchini, John Willey& sons Inc.

MODEL QUESTION PAPER

Class: II M.Sc Organic chemistry — Semester II

Paper:Organic chemistry II — Code:20OCH202

Time:3 HrsMax.Marks: 60M

PART-A

I.Answer any 5 questions out of the 10 short answer questions — 5x4=20 Marks

1. Write the mechanism and applications of Aldol condensation.
2. Explain mechanism of Reimer tiemanncondensation
3. Explain DL Nomenclature with suitable examples.
4. define Homomer , Epimer.
5. Explain the conformational analysis of n-butane.
6. Explain any 4 factors influencing the stability of conformations.
7. Write a note on green reagents
8. Write a note on Microwave assisted organic synthesis
9. Write a brief note on catalyst activated growth with suitable examples
10. Discuss catalyst free growth and catalyst activated growth

PART-B

II. Answer any 5 questions out of the 10 internal choice essay questions — 5x8=40 Marks

UNIT-I

11. Wrtie the mechanism of simonn smith and McMurray reactions

(OR)

12. Explain the following reactions with mechanism.
    a) MPV reduction b) Birch reduction

UNIT-II

13. Write a note on enantiomers and diastereomers.

(OR)

14. What are geometrical isomers and explain the methods used for the determination of configuration of geometrical isomers.

UNIT-III

15. Explain the factors influencing the stability of conformation.

(OR)

16. Explain the conformational analysis of mono and di substituted cyclohexanes

UNIT-IV

17. Write 12 principles of green chemistry.

(OR)

18. Discuss clean Fischer Indole synthesis

UNIT-V

19. Write a note on structure of single and Multi walled carbon nanotubes

(OR)

20. Discuss the properties of carbon nanotubes?

V.D P.Kumpani D.Madhu K.Kumkumar V.Nerella M.Jyothi

Department of Chemistry
SRR & CVR Govt. Degree College(A), Vijayawada

M.Sc., CHEMISTRY (ORGANIC CHEMISTRY) II SEMESTER

Paper Code & Title: 20 OCH 203: INORGANIC CHEMISTRY-II

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

Total marks: 100 **(Internal: 40 M & External: 60M)**

Course Learning Objective(S): The main objective of this paper is to give a basic and updated knowledge for the students on Non-metal cages and metal clusters, Organometallic chemistry of transition metals, Reaction mechanism of transition metal complexes, Term symbols and Electronic spectra and Bio-inorganic chemistry and Magnetic properties of complexes.

Unit-I: Non-metal cages and metal clusters: Structure and bonding in phosphorous-oxygen, phosphorous-Sulphur cages; structure and bonding in higher boranes .Carboranes,metallocarboranes. Classification- LNCs and HNCs, Isoelectronic and Isolobal relationships, electron counting rules: Wade's and Lauher's rules. preparation, structure and bonding in dinuclear $[Re_2Cl_8]^{2-}$ ion, trinuclear $[Re_3Cl_9]$, tetra nuclear $W_4(OR)_{16}$, hexa nuclear $[Mo_6Cl_8]^{4+}$ and $[Nb_6Cl_{12}]^{2-}$.

Unit-II: Organometallic chemistry of transition metals: Classification and electron counting rules, hapticity, synthesis, structure and bonding of Olefinic complexes, Acetylene complexes, ferrocene, cyclo heptatriene and tropylium complexes of transition metals. Reactions of organometallic compounds - oxidative addition reductive elimination, insertion and elimination.Catalytic hydrogenation, Hydroformylation.

Unit-III: Reaction mechanism of transition metal complexes: Kinetics of octahedral substitution, acid hydrolysis, base hydrolysis-conjugate base (CB) mechanism. Direct and indirect evidences in favour of CB mechanism. Factors affecting the substitution reactions in octahedral complexes. Trans effect on substitution reactions in square planar complexes. Mechanism of redox reactions, outer sphere mechanism, cross reactions and inner sphere mechanism.

Unit-IV: Term symbols and Electronic spectra: Term symbols: Term symbols , Hund's rules to predict ground terms and ground states. **Electronic spectra of transition metal complexes** Spectroscopic terms. Selection rules, Slater–Condon parameters, Term separation energies for d^n configurations Correlation diagrams and Orgel diagrams. Tanabe-Sugano diagrams for d1 to d^9 configurations.

Unit-V: Bio-inorganic chemistry and Magnetic properties of complexes: Storage and transport of dioxygen by Hemoglobin and Myoglobin, Chlorophyll, Vitamin B_{12} and its importance. **Magnetic properties of transition metal complexes** Types of magnetism, factors affecting Para

V. Neeraja

magnetism, anomalous magnetic moments - magnetic moments.

Nuclear Chemistry :Nuclear reactions ,Fission and Fusion

Course Learning Outcome(S): After studying this paper, students will acquire the knowledge of Non-metal cages and metal clusters, Organ metallic chemistry of transition metals, Reaction mechanism of transition metal complexes, Term symbols and Electronic spectra and Bio-inorganic chemistry and Magnetic properties of complexes.

Text books/ Reference books:

1.Inorganic Chemistry by Huheey. Harper and Row.
2.Concise inorganic chemistry by J. D. Lee, ELBS.
3.Inorganic chemistry, K.F. Purcell and J.C. Kotz, Holt Saunders international
4.Organometallic chemistry by R.C. Mehrotra and A. Singh. New Age International.
5.Advanced Inorganic Chemistry by Cotton and Wilkinson, Wiley Easter
6.Inorganic reaction mechanism by Basolo and Pearson, Wiley Eastern
7.Bioinorganic Chemistry by K. Hussan Reddy
8.Biological Aspects of inorganic chemistry by A. W.Addiso, W. R. Cullen, D.Dorphin and G. J. James. WelieyInterscience.
9.Photochemistry of coordination compounds by V. BalzaniandV.Carassiti. Academic Press.
10.Text book of Coordination chemistry by K. Soma Sekhara Rao and K.N.K. Vani, Kalyani Publishers.

MODEL QUESTION PAPER

Class: II M.Sc Organic chemistry
Paper:Inorganic chemistry II
Time:3 HrsMax.Marks: 60M

Semester II
Code:20 OCH203

PART-A

I.Answer any 5 questions out of the 10 short answer questions **5x4=20 Marks**

1.Describe the structure and bonding in higher boranes

2.What are Wades and Lauherrule ? How are they helpful in counting electrons in metal clusters.

3.Explain reactions of organometallic compounds.

4.Define hapticity and write the classification of organometallic compounds

5. Explain cross reactions

6.Write the mechanism of inner sphere reactions.

7.Explain Slater Condon parameters.

8.Discuss selection rules

9.Write a note on myoglobin

10.Explain anomalous magnetic moments.

PART-B

II.Answer any 5 questions out of the 10 internal choice essay questions **5x8=40 Marks**

UNIT-I

11.Discuss the preparation, structure, bonding and magnetic property of Re_2Cl_{8-2}ion.

(OR)

12. Explain structure and bonding in carboranes

UNIT-II

13.Write a note on catalytic hydrogenation and hydroformylation.

(OR)

14.Explain structure and bonding in Olefin complexes

UNIT-III

15.Explain acid hydrolysis and base hydrolysis.

(OR)

16.Explain Complementary and non- complementary reactions.

UNIT-IV

17.Explain Correlation diagrams and orgel diagrams.

(OR)

18. Draw T.S. diagram for d_5 configuration

UNIT-V

19.What is paramagnetism and what are the factors affecting paramagnetism

(OR)

20.Write the structure and function of vitamin B_{12}

V. Purnima P. Kalpana D. Madhu M. Jyothi V. Neeraja

Department of Chemistry
SRR & CVR Govt. Degree College(A), Vijayawada
M.Sc., CHEMISTRY (ORGANIC CHEMISTRY) II SEMESTER

Paper Code & Title: 20 OCH 204: PHYSICAL CHEMISTRY-II

No. of hours per week: 04
Total marks: 100

Total credits: 04
(Internal: 40 M & External: 60M)

Course Learning Objective(S): The main objective of this paper is to give a basic and updated knowledge for the students on Third law of Thermodynamics and Statistical thermodynamics, Polymer chemistry and Raman Spectroscopy, Electro Chemistry, Chemical kinetics and Photo chemistry, Symmetry and Group theory in chemistry.

Unit-I: Third law of Thermodynamics and Statistical thermodynamics: Nernst Heat theorem - Third law of thermodynamics - Its limitations - Determination of absolute entropy - most probable distribution, Entropy and probability - Boltzmann- Plank equation. Maxwell-Boltzmann distribution, Fermi-Dirac statistics, Partition function - calculation of thermodynamic properties in terms of partition function - Chemical equilibrium and partition function - Translational, rotational and electronic partition function - Entropy of Monoatomic gases (Sackur-Tetrode equation).

Unit-II: Polymer chemistry and Raman Spectroscopy: Classification of polymers - Free radical, ionic and Zeigler -Natta Polymerization - kinetics of free radical polymerization -Techniques of polymerization -Glass transition temperature - Factors influencing the glass transition temperature. Number average and Weight average, Molecular weights –molecular weights determinations Light scattering phenomenon. Classical and quantum theories of Raman effects, pure rotational, vibrational and Vibrational- rotational Raman spectra, selection rules.

Unit-III: Electro Chemistry-II: Reference electrode - Standard hydrogen electrode. Calomel electrode -Indicator electrodes: Metal-metal ion electrodes - Inert electrodes -Membrane electrodes - theory of glass membrane potential, potentiometric titrations, advantages of potentiometric titrations, Conductometric titrations. Electrode potentials - Double layer at the interface - rate of charge transfer - - Tafel plots - Derivation of Butler- Volmer equation for one electron transfer - electro chemical potential. - **Kohlrausch's Law and its applications**

Unit-IV: Chemical kinetics and Photo chemistry: Branching Chain Reactions - Hydrogen- oxygen reaction - lower and upper explosion limits - Fast reactions - Relaxation methods - Flash photolysis. Acid base catalysis –protolytic and prototropic mechanism. Enzyme catalysis - Michelis-Menten kinetics. **Photochemistry:** Actinometry, Reactions with low and high quantum yields, Photo sensitization, Exciplexes and Excimers, Photochemical equilibrium,Stern- Volmer equation.

V. Praveen
P. Kumpani
M. Jyothi

Unit-V: Symmetry and Group theory in chemistry: Symmetry elements, symmetry operation, definition of group, sub group, GMT tables Abelian and non-abelian groups. Point group. Representation of groups by Matrices (representation for the Cn, Cnv, Cnh, Dn etc. groups to be worked out, explicitly). Character of a representation. The great Orthogonality theorem (without proof) and its importance. Character tables. Construction of Character tables.

Solid state : Crystal structures ,Braggs law and applications

Course Learning Outcome(S): After studying this paper, students will acquire the knowledge of Third law of Thermodynamics and Statistical thermodynamics, Polymer chemistry and Raman Spectroscopy, Electro Chemistry, Chemical kinetics and Photo chemistry, Symmetry and Group theory in chemistry.

Text books/ 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.Statistical Thermodynamics - M.C.Gupta.
6.Polymer Sceince, Gowriker,Viswanadham, Sreedhar.
7.Quantitative Analysis, A.I. Vogel, Addison Wesley Longmann Inc.
8.Physical Chemistry by G.W.Castellan, Narosa Publishing House, Prentice Hall.
9.Physical Chemistry by W.J. Moore, Prentice Hall.
10.Polymer Chemistry by Billmayer.
11.Fundamentals of Physical Chemistry by K K. Rohatgi-Mukherjee. Wiley Eastern Ltd publications.
12.Statistical Thermodynamics by M.Dole.
13.Introductory Group Theory for Chemists by George Davidson.
14.Group theory for chemistry by A.K. Bhattacharya.
15.Fundamentals of Molecular spectroscopy by C.N.Banwell.
16.Molecular spectroscopy by B.K.Sharma.
17.Vibrational Spectroscopy by D.N.Sathyanarayana New Age Int. Pub.
18.Spectroscopy by Aruldas.

MODEL QUESTION PAPER

Class: II M.Sc Organic chemistry — Semester II

Paper:Physical chemistry II — Code:20 OCH204

Time:3 Hrs — Max.Marks: 60M

PART-A

I.Answer any 5 questions out of the 10 short answer questions — 5x4=20 Marks

1.Explain 3rd law of thermodynamics in determining the absolute entropy of solids.

2.Derive Sackur Tetrode equation

3.Write a note on number average and weight average molecular weights.

4.Write a note on factors affecting glass transistiontempreature

5.Write a note on standard hydrogen electrode.

6.Write note on Tafel plots.

7.Explain Michaelis-Menten kinetics

8.Write a note on flash photolysis

9.Write the group multiplication table for C_{2v} point group

10.Discuss Abelian and Non-abelian groups

PART-B

II.Answer any 5 questions out of the 10 internal choice essay questions — 5x8=40 Marks

UNIT-I

11. Derive Maxwell Boltzmann distribution

(OR)

12. Explain Fermi-dirac statistics

UNIT-II

13.Write a note on Ziegler Natta Polymerisation

(OR)

14. Explain the classical theory of Raman effect.

UNIT-III

15. Explain various types of potentiometric titrations

(OR)

16. Derive Butler Volmer equation for one electron transfer.

UNIT-IV

17 .Write the kinetics of Hydrogen and oxygen reaction

(OR)

18.Derive Stern Volmer equation.

UNIT-V

19.Discuss character tables and construction of character tables

(OR)

20.Explain Great Orthogonality theorem and its importance.

V.Ravi P.Kumaris M.Jyothi

Department of Chemistry

SRR & CVR Govt. Degree College(A), Vijayawada

M.Sc., CHEMISTRY (ORGANIC CHEMISTRY) II SEMESTER

Paper Code & Title: 20 OCH 205 : ORGANIC CHEMISTRY PRACTICAL-II

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

Total marks: 100 **(Internal: 40 M & External: 60M)**

Course Learning Objective(S): The main objective of this paper is to give a practical knowledge for the students on Organic chemistry practical.

List of experiments:

1. Preparation of organic compounds: Single stage preparations by reactions involving nitration, halogenation, oxidation, reduction, alkylation, acylation, condensation and rearrangement. (A student is expected to prepare at least 5 different organic compounds by making use of the reactions given above).

2. Preparation of organic compounds: Two stage preparations by reactions involving nitration, halogenation, oxidation, reduction, alkylation, acylation, condensation and rearrangement. (A student is expected to prepare at least 5 different organic compounds by making use of the reactions given above).

3. Systematic qualitative analysis of organic compounds with different functional groups (5 different compounds)

Course Learning Outcome(S): After studying this paper, students will acquire the knowledge of Organic chemistry practical.

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. Practical Organic Chemistry, F.G.Mann and B.C.Saunders, 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, TheophilEicher, University Science Book.

Department of Chemistry

SRR & CVR Govt. Degree College(A), Vijayawada

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY) II SEMESTER

Paper Code & Title: 20 OCH 206 : PHYSICAL CHEMISTRY PRACTIAL -II

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

Total marks: 100 **(Internal: 40 M & External: 60M)**

Course Learning Objective(S): The main objective of this paper is to give a practical knowledge for the students on Inorganic and Physical chemistry experiments.

List of experiments:

1. Relative strengths of acids by studying the hydrolysis of ethyl acetate / methyl acetate.
2. Determination of equilibrium constant of $KI + I_2 \longrightarrow KI_3$ by partition coefficient.
3. Determination of unknown concentration of potassium iodide by partition coefficient method.
4. Distribution coefficient of Benzoic acid between Benzene and water.
5. Determination of critical solution temperature of phenol-water system.
6. Study of the effect of electrolyte on the miscibility of phenol-water system.
7. Determination of Coordination number of cuprammoniumcation.
8. Potentiometric determination of Fe(II) with Cr (VI).
9. Potentiometric determination of Fe(II) with Ce (IV).
10. pH-metric determination of strong acid with strong base.
11. Conductometric titration of strong acid with strong base.
12. Conductometric titration of strong acid + Weak acid with strong base.
13. Dissociation constant of weak acid (CH_3COOH) by conductometric method.
14. Determination of cell constant.
15. Verification of Beers Law using potassium permanganate/Potassium dichromate.

Course Learning Outcome(S): After studying this paper, students will acquire the knowledge of Inorganic and Physical chemistry experiments.

Text books/ Reference books:

1. Experimental Physical chemistry by V.D. Athawale, Parul Mathur, New Age International publishers.
2. Physical chemistry experiments by V. P. Kudesia, Pragati Prakasan publishers.
3. Advanced practical Physical chemistry by J.B. Yadav, Krishna's educational publishers.

V.D.

P. Kumari

M. Jyothi

Department of Chemistry

SRR & CVR Govt. Degree College(A), Vijayawada

M.Sc – CHEMISTRY (ORGANIC CHEMISTRY) II SEMESTER

Paper Code & Title: 20 OE OCH 207: (OPEN ELECTIVE-I)

. CHEMISTRY IN DAILY LIFE

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

Total marks: 100 **(Internal: 40 M & External: 60M)**

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 Non- renewable energy resources, Methods to convert temporary hard water into soft water, DO, COD, BOD, Toxicity of lead, mercury, arsenic and Cadmium.

Unit-III: Bioinorganic Chemistry: Essential elements, biological significance of Na, K, Mg, Ca, Fe, Co, Ni, Cu, Zn and Cl. Metalloporphyrin – Structure and functions of hemoglobin, Myoglobin and Chlorophyll.

Unit-IV: Biological functions of Hormones: Introduction, mechanism of action of Adrenaline, melatonin, noradrenaline, dopamine, prostacyclin, adrenocarticotropic hormone, antidiuretic hormone, Insulin.

Unit-V: Medicinal Chemistry: Disease -medicinal molecule-mode of action of the following diseases Malaria-Artesunate, Dengue-Acetaminophen, Asthma-Albuterol, Diabetes(type-II) (iiddm) – metformin, Diabetes(type-I)(iddm) – Insulin, Arthritis-methotrexate, Glaucoma- brimonidine, Chickenpox-acyclovir, Anxiety – citalopram, Thyroid- Levithyroxine(lt4), Insomnia- estazolam, peptic ulcer, GERD(acid reflux) – Omeprazole, pantoprazole.

Course Learning Outcome(S): After studying this paper, students will acquire the knowledge of Chemistry Laboratory safety symbols – Meaning, Environmental Chemistry, Bioinorganic Chemistry, Biological functions of Hormones and Medicinal Chemistry.

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. Trip

Department of Chemistry
SRR & CVR Govt. Degree College(A), Vijayawada

StudentEvaluationPolicyandProcedure

EVALUATIONPOLICYANDPROCEDURE:

Students are evaluated for 100 marks in each course.These 100 Marks are splitted intoContinuous Internal Assessment (CIA) and Semester End Evaluation (SEE). 40 marks areallocatedto CIAand 60marks forSEE.

1 .CONTINUOUSINTERNALASSESSMENT (CIA) FOR Theory 40MARKS:

Outofamaximumof100marksineachtheorypaper,40marksshallnormallybeallotted for continuous internal assessment.The Assessment shall be made by the teacherhandling that paper in the manner prescribed here under.Where the same paper ishandled by two or more teachers, the Head of the Department shall decide upon theteacher, who shall make the internal assessment or fix the proportion of the marks amongtheteachers fortheinternal assessment of the students.

A. **Out of these 40 marks, 10 marks are allotted to Continuous Internal Exams.**TwoContinuous Internal exams are conducted for 20 marks in each exam and the average ofthese two exams scale down to 10 marks, shall be deemed as the marks obtained by thestudent in Continuous Internal Exams. Out of these two exams, one exam is conductedthroughonlineusingGoogleclassroom/moodleCloud/gnomio/anyotheronlineplatform.

B. **Out of these 40 marks, 10 marks are allotted to Assignments.**Two assignments aregiven to the students during the course. 5 marks are allotted for each assignment and totalof these two assignments are included in Continuous Internal Assessment. The studentscansubmit assignments through blended mode.

C. **Out of these 40 marks, 10 marks are allotted to Project Work/ Group Discussion.**Students will be assigned student study project for 10 Marks under CIA. Then the studenthas to submit a project report under the supervision of Faculty Member. These 10 marksmay also be assigned to group discussion and paper presentation in any national seminar also . Student will be evaluated here based onhis/her way of expression, conceptual strength, attitude, listening -understanding skillsandlevel of participation in thediscussion.

V. Rama
P. Kumari
D. Madhavi
M. Jyothi
V. Neeraja

D. **Out of these 40 marks, 5 marks are allotted to Student Seminar and 5 marks forViva-Voce.**Each Student may give student seminar to the peer team.This studentseminar will carry 5 marks.Here feedback will be collected on 5 points scale from theparticipants in the student seminar [or] Viva- Voce will be conducted by the concernedsubject facultyfor 5 marks.

Thesummarizedcontinuousinternalassessmentis:

a. Average of two mid exams -10 Marks
b. Average of two assignments - 10 Marks
c. Project work/Group discussion/ paper presentation in National seminars. - 10 Marks
d. Student seminar - 5 Marks
e. Viva-voce - 5 Mark

E .CONTINUOUSINTERNALASSESSMENT (CIA) FOR Practical 40MARKS: Each student must attend Minimum 10 experiments .The entire assessment is based on the Day to day work .

Practical Internal assessment – continuous assessment / Day to Day work –

10 X 4 = 40 Marks

Practical external Assessment

Q .1 Experiment	Principle /Theory	10 Marks
	Procedure	20 Marks
	Result and discussion	10 Marks
Q.2	Viva -voce	10 Marks
Q.3	Record	10 marks
	Total	**60 marks**

F.Every student is required, to take every test for Continuous internal Assessment, unless he/she is permitted by the Principal to write at a later date on valid reasons, before the test is conducted. In case where permission is not obtained, the decisionof the Principal to hold or not to hold separate examination for such candidate is final.

G.Permission to write Internal Assessment test at the end of corresponding Semester –end exams may be given on medical grounds and other valid grounds.For suchcandidates, test/s is/are conducted by the faculty member concerned in consultationwiththeHead of theDepartment with adifferent questionpaper.

H.The Student has to get minimum 40 per cent (16 Marks) marks in the ContinuousInternalAssessment to complete theCoursePaper.

SuggestiveQuestionPaperPatternforCIA& SEE(BasedonBloomsTaxonomy):

Though the faculty concerned is empowered to adopt their own pattern for questionpaper, a general and suggestive model for question paper is given below based onBloomsTaxonomy.

UniversityRepresentative | SubjectExpect | SubjectExpect | ChairmanofBoS