

**S. V. K. P. & Dr. K. S. RAJU ARTS & SCIENCE COLLEGE (A)**  
**Penugonda-534320, W. G. Dt., A.P.**

**M.Sc. Organic Chemistry – I Semester**  
**PAPER –I: GENERAL CHEMISTRY-I (19OCHT11)**  
*(With effect from 2019-20 Admitted batch)*

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) What is Quantum Chemistry? Explain important postulates of quantum mechanics.  
(OR)  
b) Discuss the setting up of operators for different observables.
- 2.a) What is Rigid Rotator model? Add a note on simple harmonic oscillator.  
(OR)  
b) Derive the Schrodinger wave equation for a particle in one dimensional box with constant potential energy?
- 3.a) (i) How do you explain rotational and vibrational spectra of diatomic molecules based on Infrared spectroscopy.  
(ii) what is Zero point charge? Explain ?  
(OR)  
b) (i) Give an account on Overtones and combination bands.  
(ii) Explain Fermi Resonance with an example.
- 4.a) How do you Explain Raman Spectra on the basis of Classical and Quantum Mechanical approach  
(OR)  
b) Describe the PQR spectrum in Rotational fine structure of the electronic spectrum of diatomic molecules.

**SECTION-B**

**(3x 5 = 15 Marks)**

**Answer any THREE questions**

5. Discuss linear and non linear Commutator Operators.
6. Explain factors affecting colour transition.
7. Write brief note on Isotopic effect with an example.
8. Derive the solution of wave equation.
9. What is Vibrational Coarse structure? Explain?
10. Write applications of Frank- Condon Principle.

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**M.Sc. Organic Chemistry – I Semester**  
**PAPER –II: INORGANIC CHEMISTRY-I (19OCHT12)**  
(With effect from 2019-20 Admitted batch)

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) Explain Valence bond theory. Explain Walsh diagram for  $\text{H}_2\text{O}$  molecule.  
(OR)  
b) Draw the MO energy level diagram for  $[\text{Co}(\text{NH}_3)_6]^{3+}$ ,  $\text{CoF}_6$  and discuss their magnetic properties.
- 2.a) Discuss the preparation, structure and reactions of Boranes and Metallocarboranes.  
(OR)  
b) Write about (i) Homopoly and Heteropoly acids (ii) Wades rules
- 3.a) Explain the Jahn Teller Effect with applications  
(OR)  
b) Explain the Crystal field splitting patterns in Tetrahedral and Square planar geometries with suitable examples ?
- 4.a) Draw the Orgel and Tanabe Sugano diagrams for  $d^2, d^3, d^7$  and  $d^8$ , Octahedral metal complexes.  
(OR)  
b) Discuss about the significance of Charge Transfer Spectra.

**SECTION-B**

**(3 x 5 = 15 Marks)**

**Answer any THREE questions**

5. Write brief note on the principles involved in VSEPR Theory.
6. Write the structure and properties of Borazole.
7. Write an account on Spin- Orbit Coupling.
8. Write a short note on Spectrochemical Series.
9. Explain the selection rules briefly w.r.t. electronic spectra of complexes.
10. What is contribution of Spin Magnetic Moment?

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**M.Sc. Organic Chemistry – I Semester**  
**PAPER –III: ORGANIC CHEMISTRY-I (19OCHIT13)**  
(With effect from 2019-20 Admitted batch)

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) Explain the role of Inductive effect, Mesomeric effect (Resonance) and Hyper Conjugation in Organic Molecules.

(OR)

b) What is Aromaticity ? Explain this phenomenon using Huckle's rule and MO theory with suitable examples.

2. a) Define Stereo Chemistry and classify the Stereoisomers.

(OR)

b) How do you classify organic compounds into Cis-Trans, E-Z and Syn & anti nomenclature. Discuss the stability of disubstituted cyclohexanes.

3. a) Write notes on Pyridazine, Pyrimidine and Pyrazine.

(OR)

b) Describe the synthesis and reactivity of Isoquinoline and Indole.

4. a) Outline the Isolation, structure elucidation and synthesis of  $\alpha$ -pinene?

(OR)

b) Outline the Isolation, structure elucidation and synthesis of Camphor.

**SECTION-B**

**(3 x 5 = 15 Marks)**

**Answer any THREE questions**

5. Explain Hyper Conjugation with suitable examples.

6. Define terms Invariantomer, Homomer, Epimer and Anomer.

7. Write the structure of Quinoline. What is the expected product(S) when this is oxidized with potassium permanganate.

8. Draw the structures of Atropine, Nicotine and Quinine.

9. Explain the E-Z nomenclature with suitable examples.

10. Write any three differences between conformation and configuration.

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**M.Sc. Organic Chemistry – I Semester**  
**PAPER –IV: PHYSICAL CHEMISTRY-I (19OCHT14)**  
*(With effect from 2019-20 Admitted batch)*

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) i) Derive Gibbs-Duhem equation.  
ii) Explain Thermodynamic properties of ideally dilute solutions.  
(OR)
- b) i) How to determine activity coefficients from vapour pressure measurements? Give mathematical support.  
ii) Derive an expression for the effect of temperature on equilibrium constant.
2. a) i) What is Critical Micellar Concentration? Explain the factors effecting the CMC of surfactants  
ii) Explain thermodynamics of micellization on the basis of phase separation model.  
(OR)
- b) i) Write a note on electrically conducting polymers.  
ii) Explain viscometry method for the determination of molecular weight of a polymer.
3. a) i) Derive an expression for collision theory and its limitations.  
ii) Discuss the effect of dielectric constant of solvent on rate constant of a reaction.  
(OR)
- b) i) Write short notes on consecutive reactions.  
ii) Explain continuous flow method for studying kinetics of fast reactions.
4. a) i) Write short notes on ferrioxalate and uranyl oxalate actinometers.  
ii) What is quenching effect? Derive Stern-Volmer equation.  
(OR)
- b) i) Explain E-type delayed fluorescence.  
ii) Discuss photo-addition reactions with examples.

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**SECTION-B**

**(3 x 5 = 15 Marks)**

**Answer any THREE questions**

5. Explain the variation of chemical potential with temperature and pressure.
6. Discuss micellar solubilization.
7. Discuss general acid-base catalysis with an example.
8. Write a note on photochemical equilibrium.
9. How to determine partial molar volume by intercept method.
10. Give an account on primary salt effect.

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**M.Sc. Organic Chemistry – II Semester**  
**PAPER – I: GENERAL CHEMISTRY-II (19OCHT21)**  
*(With effect from 2019-20 Admitted batch)*

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) Explain the time independent perturbation theory deal with only for first order.  
(OR)  
b) Write the variation principle and apply it to calculate the zero point energy of harmonic oscillator.
2. a) Discuss classification of molecules into point groups with suitable examples.  
(OR)  
b) (i) Write matrix representations for proper axis of rotation and reflection operations  
(ii) Explain great orthogonality theorem.
3. a) (i) Define precision and accuracy. Give an example for each.  
(ii) Give the classification of errors.  
(OR)  
b) (i) Write notes on significant figures and computation rules.  
(ii) Explain the following: (a) Absolute and relative errors (b) Standard error of mean
4. a) Discuss the significance of flow charts. Write flow chart and computer programming for the calculation of rate constant for first order reaction.  
(OR)  
b) Explain the development of FORTRAN statements for simple formulae in chemistry such as vander wall's equation.

**SECTION-B**

**(3 x 5 = 15 Marks)**

**Answer any THREE questions**

5. Explain the probability density in atomic orbitals.
6. Write a note on reducible and irreducible representations.
7. Write different methods for minimisation of errors.
8. Explain input and output devices of a computer.
9. Write group multiplication table for  $C_{2v}$  point group.
10. Write a short note on T- test and F – test.

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**M.Sc. Organic Chemistry - II Semester**  
**Paper - II: INORGANIC CHEMISTRY- II (19OCHT22)**

*(With effect from 2019-20 Admitted batch)*

**Time: 3 hrs,**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) Discuss the preparative methods and structural aspects of Hexa- nuclear Metal Clusters.  
(OR)  
b) Discuss the structure and bonding in  $\text{Re}_2\text{Cl}_8^{2-}$  and  $\text{Mo}_2\text{Cl}_8^{4-}$
2. a) Explain structural features and bonding aspects of Ferrocene.  
(OR)  
b) Discuss the structure, bonding and reactions of Nitric oxide .
3. a) Explain concept of lability and inertness in terms of VBT and CFT.  
(OR)  
b) Discuss the biological role of alkali and alkaline earth metals with special reference to  $\text{Ca}^{2+}$ .
4. a) Discuss the mechanism of electron transfer reactions of complexes with suitable examples.  
(OR)  
b) Explain the significance of Inner sphere and Outer sphere mechanism.

**SECTION-B**

**(3 x 5 = 15 Marks)**

**Answer any THREE questions**

5. What is meant by Polyatomic Cluster?
6. Write a brief note on Isoelectronic relationship.
7. What is meant by Chelate effect?
8. Write a brief note on complimentary reactions.
9. State and explain 18 electron rule.
10. How do you determine the stability of a complex by P<sup>H</sup>metrically?

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**M.Sc. Organic Chemistry – II Semester**  
**Paper – III: ORGANIC CHEMISTRY- II (19OCHT23)**  
*(With effect from 2019-20 Admitted batch)*

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) (i) What is neighbouring group participation. How the neighbouring group participation occurred in oxygen nucleophiles.

(ii) Write a note on aromatic nucleophilic substitution reactions.

(OR)

- b) (i) Write the mechanism of E<sub>2</sub> elimination reaction with suitable example.

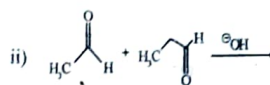
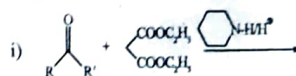
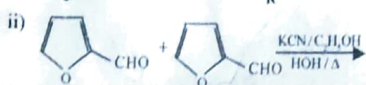
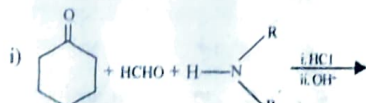
(ii) What is saytzeff rule and explain with examples?

2.

- a) Predict the products and write the mechanism of the following reaction.

(OR)

- b) Complete the following reactions and write the mechanism.



3. a) Describe the mechanism of the following reactions.

(i) Wagner – Meerwin rearrangement. (ii) Arndt- Eistert rearrangement.

(OR)

- b) Explain the mechanism of the following reactions.

(i) Neber rearrangement (ii) Bayer- Villiger rearrangement.

4. a) (i) What is protecting group? Explain the protection of alcohols.

(ii) Give an account of the selective protection of amine group in peptide synthesis.

(OR)

- b) (i) Write a note on Chromophore, Auxochrome, Bathochromic shift and Hypsochromic shift.

(ii) Discuss about the base peak, Molecular ion peak, metastable peak and MC- Lafferty rearrangement.

**[PTO]**



**SECTION-B**

**(3 x 5 = 15 Marks)**

**Answer any THREE questions**

5. Write a short note on Dehydrogenation and Dehydration.
6. Explain the smiles rearrangement.
7. Write a note on Regio and Stereoselectivity.
8. What is Nitrogen rule ? Give any three examples.
9. What is Birch reduction and explain its mechanism.
10. Write the mechanism of Curtius rearrangement.

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**M.Sc. Organic Chemistry – II Semester**  
**Paper –IV: PHYSICAL CHEMISTRY- II (19OCHT24)**  
*(With effect from 2019-20 Admitted batch)*

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) (i) Write a note on Chemical shift and its origin.  
(ii) Give the NMR spectrum of pure and acidified ethanol.  
(OR)  
b) (i) Explain the principle and theory of ESR spectroscopy.  
(ii) Write a short note on line widths and line shapes in ESR.
2. a) (i) Derive expressions for entropy changes accompanying Expansion and Phase transition.  
(ii) State third law of thermodynamics. Discuss the application of third law of thermodynamics in determination of absolute entropy of solids.  
(OR)  
b) (i) Derive an expression for translational partition function.  
(ii) Based on thermodynamic probability, derive the Maxwell Boltzmann distribution law.
3. a) Explain in detail about the concentration cell with and without transference.  
(OR)  
b) (i) Explain Debye-Huckel theory of electrolytic solutions.  
(ii) Write a note on fuel cells.
4. a) (i) Explain the stern model for double layer. How is it better compared to parallel plate and Gouy Chapman model.  
(ii) Write a note on exchange current density and over potential.  
(OR)  
b) (i) Derive Butler-Volmer equation.  
(ii) Derive Nernst equation.

**[PTO]**

**SECTION-B**

**(3 x 5 = 15 Marks)**

**Answer any THREE questions**

5. Write a note on spin-spin interaction.
6. Explain hyper fine interactions in ESR spectroscopy with examples.
7. Write a short note on ensembles.
8. Discuss how standard potential is determined from EMF data.
9. Explain the concept of activity and activity coefficients in electrolytic solutions.
10. Discuss the effect of complexation on redox potential of ferricyanide/ferrocyanide couple.

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**M.Sc. Organic Chemistry – III Semester**  
**PAPER –I: ORGANIC REACTION MECHANISMS-I & PERICYCLIC REACTIONS**  
**(19OCHT31)**

*(With effect from 2019-20 Admitted batch)*

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) (i) Explain neighboring group participation by  $\sigma$  and  $\pi$  bonds.  
(ii) Write the mechanism of diazo transfer and Haller – Baucer reaction.  
(OR)  
b) (i) Discuss the mechanism of  $S_E^2$  reaction and write the stereochemistry of products.  
(ii) Explain Mitsunobu reaction and Dakin – west reaction with appropriate examples.
2. a) (i) Using symmetry considerations show two hydrogens of  $CH_2Cl_2$  and  $CH_2ClF$  are homotropic or enantiotropic.  
(ii) Write a note on chiral shift reagents in asymmetric synthesis.  
(OR)  
b) (i) Explain the terms % diastereomeric excess and stereoselectivity.  
(ii) Discuss Cram's rule with appropriate example.
3. a) (i) Write the Frontier Molecular Orbitals of 1, 3, 5 – hexatriene and allyl cation. Indicate symmetry properties.  
(ii) Write a note on cheletropic reactions.  
(OR)  
b) (i) Discuss [2+2] cycloaddition of ketones with olefins by FMO approach  
(ii) Explain the terms *CON* – rotatory and *DIS* – rotatory motions.  
(iii) Ethyl alcohol and Phenol.
4. a) (i) Claisen rearrangement is thermally allowed and photo chemically forbidden – Explain by FMO approach.  
(ii) Discuss the stereochemistry Involved in [1, 3] sigmatropic rearrangement of carbon substituent thermally and photo chemically.

(OR)

- b) (i) Explain [1, 5] sigmatropic rearrangement thermally and photo chemically.  
(ii) Write a note on Fluxional tautomerism and Barton reaction.

**SECTION-B**

(3 x 5 = 15 Marks)

**Answer any THREE questions**

5. Explain hydrolysis of esters by  $Ac^+$  mechanism.
6. Describe methods for inducing enantioselectivity.
7. Explain the terms Anthracene and Suprafacial with appropriate examples.
8. Write  $[4n+2]$  cycloaddition under thermal condition by PMO approach.
9. Discuss  $[5+5]$  sigmatropic rearrangement
10. Explain  $[1, 3]$  sigmatropic rearrangement by PMO approach

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**M.Sc. Organic Chemistry – III Semester**  
**Paper –II: ORGANIC SPECTROSCOPY-I (19OCHT32)**  
(With effect from 2019-20 Admitted batch)

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

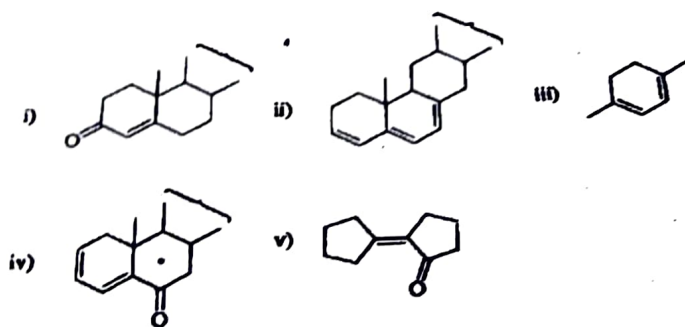
**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) (i) Explain about bathochromic shift and hypsochromic shift by appropriate examples.  
(ii) How do you distinguish the biphenyl & 2-methyl biphenyl and cis & trans cinnamic acids by UV spectra.

(OR)

- b) Calculate the  $\lambda_{\max}$  values for the following compounds



2. a) Explain the following by IR spectroscopy

- (i) Geometrical isomerism  
(ii) Inter and Intra molecular hydrogen bonding.  
(iii) Keto – enol tautomerism

(OR)

- b) (i) Illustrate the factors affecting vibrational frequencies.

- (ii) Write the characteristic frequencies of –OH, C=O, –CN, C–H and Ar–H.

3. a) (i) Write the principle and instrumentation of  $^1\text{H}$  NMR.

- (ii) What is chemical shift. Explain the factors influencing chemical shift.

(OR)

b) How do you distinguish the following by PMR spectra.

- (i) cis-2Butene and trans-2-Butene.
- (ii) Propanaldehyde and Benzaldehyde.
- (iii) Ethyl alcohol and Phenol.

4. a) Explain the following :

- (i) Molecular ion peak.
- (ii) Nitrogen rule.
- (iii) Mc Lafferty rearrangement.

(OR)

b) Write the instrumentation of Mass spectrometer.

#### SECTION-B

(3 x 5 = 15 Marks)

Answer any THREE questions

- 5. Write a note on UV absorption values for Diene systems.
- 6. How do you identify aromatic aldehydes and aromatic ketones by IR spectra?
- 7. Write a note on Finger Print Region.
- 8. What is non-order spectra? Give suitable examples.
- 9. Explain Shielding, Deshielding and Chemical shift.
- 10. Write the importance of Retro Diels-Alder reaction.

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**M.Sc. Organic Chemistry – III Semester**  
**Paper –III: MODERN ORGANIC SYNTHESIS-I (19OCHT33)**

*(With effect from 2019-20 Admitted batch)*

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) Explain the following reactions.

- (i) Asymmetric aldol reaction with examples.
- (ii) Heck reaction.
- (iii) Gilman's reagent.

(OR)

b) Discuss the following reactions

- (i) Suzuki coupling.
- (ii) Baylis-Hilman reaction.
- (iii) Stork Enamine Reaction.

2. a) Explain the following reactions with mechanism and examples.

- (i) McMurry coupling.
- (ii) Wittig reaction.

(OR)

b) Describe the following reactions

- (i) Grubbs catalyst and its applications.
- (ii) Grubbs catalyst and its applications.

3. a) Explain

- (i) Barton reaction with mechanism, and examples.
- (ii) Hydroboration using 9-BBN,  $\text{IPCB}_2\text{H}_2$  and  $\text{IPC}_2\text{BH}$ .

(OR)

b) (i) How organoboranes are useful for formation of C-C bonds.

- (ii) Explain Hoffman löffler Freytag reaction.

4. a) (i) Explain Claisen rearrangement and Diels Alder reaction using Microwave technology.  
(ii) What is click reaction and explain its applications in current research.

(OR)

- b) Write a detailed note on Ultrasound assisted reactions.

**SECTION-B**

**(3 x 5 = 15 Marks)**

**Answer any THREE questions**

5. Write short notes on dimethylsulfoniummethylide.
6. Describe Wacker oxidation with examples.
7. Write short notes on Hoffman's rule.
8. Explain Claisen rearrangement with mechanism.
9. Explain oxidation reaction of organoboranes.
10. What is PTC and explain its use in organic synthesis.

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**M.Sc. Organic Chemistry – III Semester**  
**Paper –IV: CHEMISTRY OF NATURAL PRODUCTS (19OCHT34)**  
*(With effect from 2019-20 Admitted batch)*

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) Write structural elucidation of reserpine.  
(OR)  
b) Write the general methods for structural elucidation of alkaloids.
2. a) Give an account on isolation and structural elucidation of zingiberene.  
(OR)  
b) Write synthesis and stereochemistry of Taxol
3. a) Give in detail about structural elucidation of cholesterol.  
(OR)  
b) Write structural elucidation and synthesis of androsterone.
4. a) Explain synthesis of flavonoids by shikimic acid pathway.  
(OR)  
b) Explain structural elucidation and synthesis of quercetin.

**SECTION-B**

**(3 x 5 = 15 Marks)**

**Answer any THREE questions**

5. Explain physiological action of alkaloids with examples.
6. Explain classification of terpenoids with examples.
7. Write about the synthesis of Monoterpenoids.
8. Write the synthesis of progesterone.
9. Write the nomenclature of flavonoids and isoflavonoids with examples.
10. Write about the synthesis of daidzein.

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**M.Sc. Organic Chemistry – IV Semester**  
**PAPER –I: ORGANIC REACTION MECHANISMS-II & ORGANIC PHOTO CHEMISTRY**  
**(19OCHT41)**

*(With effect from 2019-20 Admitted batch)*

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) (i) Write the mechanism of Wagner – Meerwein rearrangement.  
(ii) Discuss the applications of N – bromosuccinimide allylic and benzylic bromination  
(OR)  
b) (i) Write the mechanism of  
(a) Gomberg reaction  
(b) Stevens rearrangement  
(ii) Describe Hammett equation.
2. a) (i) Describe the use of chiral auxiliaries in Diels – Alder reaction.  
(ii) Write a note on enzyme mediated enantioselective synthesis.  
(OR)  
b) (i) Discuss the diastereoselectivity in aldol reaction taking chiral enolate and achiral aldehyde as an example.  
(ii) Write the mechanism of asymmetric hydroboration with chiral borane reagents.
3. a) (i) Describe  
(a) Photo reduction  
(b) Norrish type – I cleavage process  
(ii) Write a note on Photosensitization reaction  
(OR)  
b) (i) Explain photoenolization with suitable example.  
(ii) Write the mechanism and stereochemistry involved in Paterno – Buchi reaction.
4. a) (i) Discuss the mechanism of

- (a) Di- $\pi$ -methane rearrangement  
(b) Barton reaction  
(ii) Describe the valence isomers of benzene.

(OR)

- b) (i) Discuss cis-trans isomerization of alkenes.  
(ii) Write a note on 1,2 and 1,4-addition reactions of benzene.

**SECTION-B**

**(3 x 5 = 15 Marks)**

**Answer any THREE questions**

5. Write the mechanism of Wittig rearrangement.
6. Explain Cram's rule.
7. Describe the Quantum yield and Quantum efficiency.
8. Discuss how quenching experiment is useful to study the mechanism of the reaction.
9. Describe photochemistry of pyridinium yields.
10. Write the mechanism of photo-Fries rearrangement.

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**M.Sc. Organic Chemistry – IV Semester**  
**Paper – II: ORGANIC SPECTROSCOPY-II (19OCHT42)**  
*(With effect from 2019-20 Admitted batch)*

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) Write about the following

(i) ORD and CD curves

(ii) Applications of ORD curves

(OR)

b) Write about the Octant Rule and write the applications of Octant Rule in structural studies

2. a) Write a short note about the following

(i) Write about the Nuclear Overhauser Effect (NOE)

(ii) Write about the COSY and DEPT Spectra.

(OR)

b) Write a short note about the following

(i) Spectra Analysis of AB and AMX systems.

(ii) Write about HETCOR and INADEQUATE spectra

3. a) Deduce the structure of the compound with the following spectral data

IR ( $\text{cm}^{-1}$ ): 1725(S), 1225 (br,s), 749 (S) and 697  $\text{cm}^{-1}$  (S)

UV ( $\lambda_{\text{max}}$ ): 268, 264, 262 and 257 nm

$^1\text{H}$  NMR:  $\delta$ 1.96 (3H, S), 5.00 (2H, S) and 7.22(5H, S)

(OR)

b) An organic compound X gave the following spectral data:

Mass ( $m/z$ ): 73, 91, 149 and 164

IR ( $\text{cm}^{-1}$ ): 1730

$^1\text{H}$  NMR:  $\delta$ 2.0 (3H, S), 2.93[2H, t ( $J=7\text{Hz}$ )], 4.30[2H, t ( $J=7\text{Hz}$ )] and 7.30 (5H, S)

Determine the structure of the compound X

4. a) Write a short note on the following:

- (i) Thin Layer Chromatography.
- (ii) Column Chromatography.

(OR)

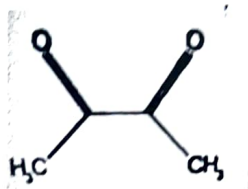
b) Write a detailed note on High Performance Liquid Chromatography (HPLC).

**SECTION-B**

**(3 x 5 = 15 Marks)**

**Answer any THREE questions**

- 5. Write a note on Axial Halo Ketone rule.
- 6. Explain F T technique?
- 7. What is Lanthanide shift reagents? Explain.
- 8. Predict IR,  $^1\text{H}$  NMR and Mass spectral data for the following compound.



- 9. What is the principle of Solvent Extraction?
- 10. Write the Instrumentation of Gas Chromatography?

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**M.Sc. Organic Chemistry – IV Semester**  
**Paper –III: MODERN ORGANIC SYNTHESIS-II (19OCHT43)**  
(With effect from 2019-20 Admitted batch)

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) Write a note on the following:

- (i) Synthetic applications of  $\alpha$  – Silyl carbanions.
- (ii) Synthetic applications of Trimethyl silyl cyanide and Trimethyl silyl iodide.

(OR)

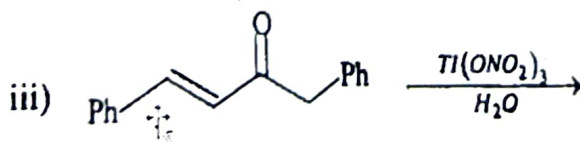
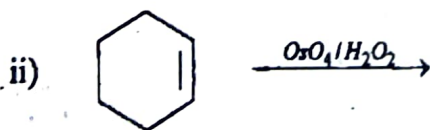
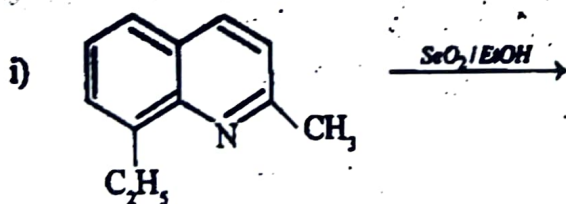
- b) (i) Write Peterson's olefination reaction in acidic and basic conditions?  
(ii) Discuss principle and synthetic applications of allyl silanes?

2. a) Describe the synthetic applications of

- (i)  $\text{Pb}(\text{OAc})_4$
- (ii) Corey's reagent
- (iii) DDQ

(OR)

b) Complete the following reactions with mechanism





3. a) Discuss the mechanism of
- (i) Clemenson reduction
  - (ii) Wolff - Kishner reduction
  - (iii) Wilkinsons catalytic reduction

(OR)

- b) Explain the reduction with hydride transfer reagents.

4. a) Write a note on the following
- (i) Functional Group Interconversion
  - (ii) Synthetic Equivalents
  - (iii) Linear Synthesis

(OR)

- b) Write briefly on:

- (i) One group C – C disconnections by giving suitable examples
- (ii) Convergent Synthesis

#### SECTION-B

(3 x 5 = 15 Marks)

Answer any **THREE** questions

- 5. Write the synthetic applications of Trimethyl silyl chloride.
- 6. Explain Rubottom oxidation with mechanism.
- 7. Explain Swerns oxidation with one example.
- 8. Explain oxidation with  $\text{SeO}_2$
- 9. Write the reduction with Di Imide.
- 10. What is Functional Group Addition? Give examples.

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**M.Sc. Organic Chemistry – IV Semester**  
**Paper –IV: BIO-ORGANIC CHEMISTRY (19OCHT44)**  
*(With effect from 2019-20 Admitted batch)*

**Time: 3 hrs.**

**MODEL QUESTION PAPER**

**Max. Marks: 75**

**SECTION-A**

**(4 x 15 = 60 Marks)**

**Answer ALL questions**

1. a) (i) Write note on steps involved in synthesis of ATP.  
(ii) Write short notes on Merrified solid phase synthesis.  
(OR)  
b) (i) Discuss briefly about Oxidoreductases and hydrolases.  
(ii) Write the synthesis of Dolostatin-10
2. a) (i) How is Streptomycin obtained from Streptidine? Describe the structural elucidation of Streptomycin.  
(ii) Discuss the mechanism of action of Penicillins.  
(OR)  
b) (i) Write the structural determination of Cephalosporin-C and give its mode of action.  
(ii) Explain the synthesis of Paludrine.
3. a) (i) Discuss how the structure of thiamine is established.  
(ii) Elucidate the structure of PGE<sub>1</sub>.  
(OR)  
b) (i) Write the biological functions of VitamineA<sub>1</sub>.  
(ii) Write a note on biogenesis and physiological effects of Prostaglandis.
4. a) (i) What are the biological functions of DNA and RNA.  
(ii) Write a detail note on:  
a) Heterocyclic bases  
b) Nucleosides  
(OR)  
b) Write short notes on:  
a) Genetic code  
b) Finger print test.

**SECTION-B**

**(3 x 5 = 15 Marks)**

**Answer any THREE questions**

5. What are enzymes. Give classification based on mode of action.
6. Discuss briefly the synthesis of  $\alpha$ -Amino acids.
7. Write a short notes on hydrolysis products of Streptomycin.
8. Describe the nomenclature of Prostaglandins and their biological importance.
9. Describe any one route of synthesis of:
  - i) Thiamine
  - ii) Nicotinic acid
10. Discuss the role of recombinant DNA technology in Insect Control.

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