PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS)

KAKINADA - 533 001, EAST GODAVARI, A.P.

Affiliated to Adikavi Nannaya University

NAAC Accredited with "A" Grade (3.17 CGPA)

BOARD OF STUDIES OF CHEMISTRY

B.Sc. Chemistry Under CBCS

Meeting Minutes/Resolutions

2021-22

Convened on 02 December 2021

DEPARTMENT OF CHEMISTRY

P. R. GOVT. COLLEGE (Autonomous)

Opp. Mc Laurin High School, Raja Ram Mohan Roy Road, Kakinada

www.prgc.ac.in; e-mail: chemistry_dept@prgc.ac.in

P. R. Govt. College (A), Kakinada

Recommended Composition and Functions of the Board of Studies of Chemistry: 2021-22

I Composition

1. **Head of the Department concerned (Chairman):**

   Dr. D. Rama Rao, M.Sc., B. Ed., M. Phil., Ph.D.

2. **The entire faculty of each specialization.**
   1. Dr. D. Chenna Rao
   2. V. Sanjeeva Kumar
   3. T. V. V. Satyanarayana
   4. P. Vijay Kumar
   5. V. Rambabu
   6. G. Pavani
   7. Dr. T. Uma Maheswara Rao
   8. Dr. N. Bujji Babu
   9. Dr. Ch. Praveen
   10. V. Venkateswara Rao
3. **One expert in the subject from outside the college to be nominated by the Academic Council**

   Sri. V. Mallikarjuna Sarma, Lecturer in Chemistry, ASD Govt. Degree College for Women (Autonomous), Kakinada.
4. **One expert to be nominated by the Vice-Chancellor from a panel of six recommended by the College Principal**

   Dr. K. Jhansi Lakshmi, Lecturer in Chemistry, ASD Govt. Degree College for Women (Autonomous), Kakinada.
5. **One representative from industry/ Corporate Sector/ allied area relating to Placement.**

   Dr. B. Ramesh Babu, Founder & M.D., BogaR laboratories, Peddapuram.
   Ph: 9701712028.
6. **One postgraduate meritorious alumnus to be nominated by the Principal. The chairman, Board of Studies, may with the approval of the Principal of the College, Co-opt.**

   K.N.S. Swamy, M.Sc., APSET (Student Alumni Member)

II. Term

The term of the nominated members shall be two years.

III. Meeting

The Principal of the College shall draw the schedule for meeting of the Board of Studies for different Departments. The meeting may be scheduled as and when necessary but at least once in a year.

IV. Functions

The Board of Studies of a Department in the College shall:

a) Prepare syllabus and various courses keeping in view the objectives of the College interest of the stakeholders and national requirement for consideration and approval of the Academic Council.
b) Suggest methodologies for innovative teaching and evaluation techniques.
c) Suggest panel of names to the Academic Council for appointment of examiners.
d) Coordinate research, Teaching, Extension and other academic activities in the Department/ College.

P.R. GOVT.COLLEGE (A) KAKINADA
DEPARTMENT OF CHEMISTRY

Meeting of Board of Studies in Chemistry is convened on 02 December 2021 through offline at P.R. Govt. College (A), Kakinada, at 3.00 PM.

Venue: Conference Hall, Dt: 02-12-2021, Thursday – 3.00 PM.

The Principal Dr. B.V. Tirupanyam, Chairman, Dr. D. Rama Rao, University Nominee, Dr. K. Jhansi Lakshmi, Lecturer in Chemistry, ASD Govt. Degree College for Women (Autonomous), Kakinada, Industrialist Dr. B. Ramesh Babu, Founder & M.D., BogaR laboratories, Peddapuram, Subject Expert Sri. V. Mallikarjuna Sarma, Lecturer in Chemistry, ASD Govt. Degree College for Women (Autonomous), Kakinada, all the faculty members of Chemistry Department and student alumni attended the meeting.

Agenda:

- To discuss the Semester System and Choice Based Credit System (CBCS) being implemented for the past 06 years, i.e., w.e.f. 2015-16.
- To discuss and approve the Continuation/Modifications of the syllabus for the Odd & Even Semesters of I, II & III Years for 2021-22.
- Grant of Extra credits for Online SWAYAM MOOCs etc.
- Syllabus, Model Question Papers and Model Blue Prints for I, II, III, IV, V and VI Semesters.
- Teaching learning methodology by 60:40 (External: Internal) ratio for the present II- and III-Year Students and 50:50 (External: Internal) ratio I Year Students w.e.f. 2021-22.
- Panel of paper setters and examiners.
- Proposals for Community Service Projects/Extension activities for the benefit of the society.
- Department action plan for 2021-22.
- To discuss and resolve the minor modifications/refinement if any, in the cluster electives CI, CII & CIII as majority of the students opting this cluster as their choice.
- Any Other Proposal with the Permission of the Chairman.

Resolutions:

The Board of Studies meeting was convened by the Chemistry Department on 02.12.2021 at 3.00 pm under the chairmanship of Dr. D. Rama Rao, In-charge of the department. Dr. K. Jhansi Lakshmi, University Nominee., Sri. V. Mallikarjuna Sarma, Lecturer in Chemistry, ASD Degree College for Women's, Kakinada and all members of the faculty of Chemistry and student representatives attended the meeting. The following agenda items are discussed and resolutions are made.

1. It is resolved to continue choice-based credit system in the chemistry combination programmes as per the directions of the CCE, Vijayawada to the first year, second year and final year students for the academic year 2021-22.
2. Resolved to follow 50%-50% external and internal pattern of evaluation w. e. f. 2021-2022 admitted batch and it will be continued in second and third year consecutively.
3. Resolved to follow 60%-40% external and internal for 2018-2019 and 2019-2020 admitted batch and the same is continued in second and third year.
4. It is resolved to allocate 50 marks for project work for final year students of chemistry in cluster paper C - 3 practicals, w.e.f 2021-22 in accordance with APSCHE.
5. It is resolved to conduct Departmental activities such as OZONE DAY, CHEM FEST, CHEMISTRY DAY, SCIENCE DAY etc.
6. It is resolved to offer Subject Electives and clusters A, B and C in the VI Semester as per the guidelines of AKNU
7. It is resolved to implement the recommended pedagogy for the first semester 2021-22
8. Resolved to conduct practical examinations semester wise.
9. It is resolved to organize guest lectures by eminent professors.
10. Resolved to implement no pass minimum for internal assessment for CBSE pattern students as the pattern is learner oriented.
11. It is resolved to maintain status quo for question paper pattern in I, II, III years.
12. It is resolved to encourage students enroll in MOOCS Online Programmes and give extra credits for students after successful completion of the courses.
13. Resolved to submit proposals to conduct a faculty development program in instrumentation techniques/ advanced topics with the assistance of the industry representatives and university representatives.
14. Resolved to assist the orphan children of below two years age being taken by

department of women and child welfare as an extension activity with the funds contributed by the faculty members of the Department.

15. Resolved that the syllabus/ workload distribution to the individual lecturers is either as Paper wise or as Track wise.

Signatures of the members who attended the Board of studies in Chemistry

On 02nd December 2021

Mode of Conduct of meeting: Offline

1. Dr. D. Rama Rao	Chairman & Lecturer in Charge
2. Dr. K. Jhansi Lakshmi,	University representative ASD Govt. Degree College for Women (Autonomous), Kakinada..
3. Dr. B. Ramesh Babu,	Founder & M.D., BogaR laboratories, Peddapuram. Ph: 9701712028.
4. Sri. V. Mallikarjuna Sarma	Subject expert Lecturer in Chemistry, ASD Degree College for Women's, Kakinada
5. Dr. D. Chenna Rao	Member
6. V. Sanjeeva Kumar	Member
7. T. V. V. Satyanarayana	Member
8. P. Vijay Kumar	Member
9. V. Ram babu	Member
10. G. Pavani	Member
11. Dr. T. Uma Maheswara Rao	Member
12. Dr. N. Bujji Babu	Member
13. Dr. Ch. Praveen	Member
14. V. Venkateswara Rao	Member
15. K.N.S. Swamy	Student Alumni Member

Signatures of the members who attended the

Board of studies in Chemistry on 02.12.2021 at 3.00pm

Mode of Conduct of meeting: Offline

NAME	SIGNATURE	CONTACT NO.
Dr. D. Rama Rao		
Dr. K. Jhansi Lakshmi		9441236409
Dr. B. Ramesh Babu		9701712028
Sri. V. Mallikarjuna Sarma		9676822550
Dr. D. Chenna Rao		9560740108
V. Sanjeeva Kumar		9849324966
T. V. V. Satyanarayana		9490876913
P. Vijay Kumar		9652023082
V. Ram babu		9948485537
G. Pavani		9701877823
Dr. T. Uma Maheswara Rao		9247714077
Dr. N. Bujji Babu		9441394792
Dr. Ch. Praveen		9491185518
V. Venkateswara Rao		9885165588
K.N.S. Swamy		9908900962

ACTION PLAN BOS MEETING -CHEMISTRY HELD ON 02.12.2021.

1. **Department activities for 2021-22 academic year.**

Annexure- I

Month	Activity proposed	Faculty member in charge
July-21	Departmental staff meeting to review results and class work allotment	Dr. D. Rama Rao
July - 21	Preparation of curricular plans, time-tables etc.,	All Faculty Members
Aug - 21	Remedial coaching classes for II & III year supplementary exams	All Faculty Members
Sept-21	Ozone day	All Faculty Members
Nov-21	National Education Day – Outreach Program to nearby school	All Faculty Members
	Student awareness programmes on ragging& eve teasing - consequences , self- discipline, career guidance, higher education opportunities etc.,	All Faculty Members
	Bridge classes for I year students	All Faculty Members
Dec-21	World AIDS Day	All Faculty Members
	Chemistry day & Chem fest	All Faculty Members
Jan-21	10 days coaching for PG entrance examinations in chemistry Study tour / Field trips	All Faculty Members
Feb-21	NATIONAL SCIENCE DAY	All Faculty Members
March-21	Consumer awareness day	Dr. D. Rama Rao

2. **Organizing National/ State level seminars/Workshops/ Conferences/ Training programs etc., with topics and other details.**
(Mandatory for each Department)

i) Faculty Development Program
ii) Student Training Programme in TLC/Column Chromatography
iii) Awareness on OZONE protection
iv) National Chemistry day
v) National Science day 2021
vi) Guest Lectures
vii) National seminar in chemistry
viii) Training in Soil analysis
ix) Training in water analysis

3. **Change of modules in the syllabus content.**
Syllabus changed for first, second and final years as per university regulations and CBCS pattern.

4. **Plan for utilization of funds for Autonomous/CPE/other grants available for arranging guest lectures, faculty improvement programs, study tours, equipping laboratories, reference books& other necessary teaching-learning material with ICT enabled teaching.**

I. Study visits to: **Rs, 50,000**

1. Visakha Steel Plant, Visakhapatnam
2. Hetero Laboratories, Nakkapally
3. Dr. Reddy's Laboratories, Yanam.
4. National Institute of Hydrololgy, Kakinada.
5. SAR Chandra Environ Solutions, Kakinada.
6. ONGC mini refinery, Tatipaka.
7. Soil analysis laboratory, Samalkot.
8. IICT,HYD
9. Venky parenterals, Yanam

II. Purchase of Equipment

1. Sophisticated version UV-Visible spectrophotometer- 5.0 lakhs
2. Rotavapour 4.0 lakhs
3. Other equipment 1.0 lakhs

5. **Plan for organizing subject oriented community outreach programs & allocation of necessary funds. (Mandatory for each Department)**
   i) Adoption of village Rs. 20,000
   ii) Medical Awareness programs Rs. 10,000

6. **Instituting of new medals/incentives/prizes etc., from alumni, philanthropists, parents, faculty etc., - Strategies to be recommended**

7. **Introduction of new programs –PG/UG/Diploma and certificate courses.**

8. **Any other program that enhances the learning capacity of students and their employable & knowledge skills.**
   Training in the use of instruments like AAS, UV-Vis, HPLC, flame photometer, uranium analyzer, soil and water analysis projects, air quality projects.

9. **Proposed panel of examiners/paper setters & other experts/nominees for BOS deliberations.**

Chemistry:

1. Sri. V. Mallikarjuna Sarma, Lecturer in Chemistry, ASD Govt. Degree College for Women (Autonomous), Kakinada.
2. Dr. V. Narayana Rao, Lecturer in Chemistry, GDC, Perumallapuram.
3. Dr. T. Narasimha Murthy, Lecturer in Chemistry Govt. Arts College, Rajamahendravaram.
4. Dr. P. Siva Kumar, Lecturer in Chemistry, Govt. Arts College, Rajamahendravaram.
5. Sri. U. Sai Krishna, Lecturer in Chemistry, Govt. Arts College, Rajamahendravaram
6. Sri. K. Anand, Lecturer in Chemistry, GDC, Pithapuram.

Structure of Chemistry Syllabus under CBCS

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS
I	I	I	Inorganic and Physical Chemistry	100 (50:50)	04
			Practical – I	50	01
	II	II	Organic and General Chemistry	100 (50:50)	04
			Practical – II	50	01
II	III	III	Spectroscopy and Physical Chemistry	100 (60:40)	04
			Practical – III	50	01
	IV	IV	Inorganic, Organic and Physical Chemistry	100 (60:40)	04
			Practical – IV	50	01
	IV	V	Inorganic and Physical Chemistry	100 (60:40)	04
			Practical – V	50	01
III	V	V	Inorganic, Organic and Physical Chemistry	100 (60:40)	03
			Practical – V	50	02
		VI	Inorganic, Organic and Physical Chemistry	100 (60:40)	03
			Practical – VI	50	02
	* Any one Paper from VII A,B and C	VII (A)*	Elective	100	03
			Practical - VII A	50	02
		VII (B)*	Elective	100	03
			Practical - VII B	50	02
		VII (C)*	Elective	100	03
			Practical - VII C	50	02
	** Any one cluster from VIII, A, B and C	VIII (A)**	**Cluster Electives - I :** VIII-A-1 VIII-A-2 VIII-A-3 Practical Practical Project	 100 100 100 50 50 50	 03 03 03 02 02 02
		VIII (B)**	**Cluster Electives - II ::** VIII-B-1 VIII-B-2 VIII-B-3 Practical Practical Project	 100 100 100 50 50 50	 03 03 03 02 02 02

		VIII (C)**	**Cluster Electives - III ::** VIII-C-1 VIII-C-2 VIII-C-3 Practical Practical Project	 100 100 100 50 50 50	 03 03 03 02 02 02

Allotment of Extra credits guidelines

Sl.No.	Activity	Details of achievement	Credits
1	MOOC Course	*SWAYAM/NPTEL/CEC etc., (Course Completion certificate with credits should be produced for the claim of extra credits)*	*Total credits achieved will be considered*
2	NCC	*B CERTIFICATE*	2
		Participation in National Camp after 'B' certificate	3
		C CERTIFICATE	4
		Adventure camp/RD parade along with 'B'	5
		Failed in B certificate Examination	1
3	Sports	*Intercollegiate selection*	2
		South zone selection	3
		All India participation	4
		Winning medals in all India competitions	5
4	NSS	*40% attendance in regular NSS activities*	1
		50% attendance with Community Service	2
		Conduct of survey/Youth exchange/RD	3
5	JKC	*Enrollment and training*	1
		Campus recruitment local level	2
		MNCs/reputed companies	3
6	Community service	*Participation in community service by departments (outreach programmes)*	2
7	Cultural activity	*Winning medals at state level-2,* *District level-1*	2 1
8	COP/Add on Course	*Pass in Certificate Exam-1,* *Diploma-2*	1 2
9	Support services	*Lead India, Health club, RRC and Eco Club etc., participation in various programmes*	1

P. R. GOVERNMENT COLLEGE, KAKINADA

SYLLABUS FOR SEMESTER – II (CHEMISTRY)

Paper II (Organic & General Chemistry) 60 hrs. (4h/w)

Course outcomes:

At the end of the course, the student will be able to;

1. Understand and explain the differential behavior of organic compounds based on fundamental conceptslearnt.
2. Formulate theme Mechanism of organic reactions by recalling and correlating the fundamental properties of the reactants involved.
3. Learn and identify many organic reaction mechanisms including Free Radical Substitution, Electrophilic Addition and Electrophilic Aromatic Substitution.
4. Correlate and describe the stereochemical properties of organic compounds and reactions.

ORGANIC CHEMISTRY **36h**

UNIT-I

Recapitulation of Basics of Organic Chemistry

Carbon-Carbon sigma bonds (Alkanes and Cycloalkanes) **12h**

General methods of preparation of alkanes- Wurtz and Wurtz Fittig reaction, Corey House synthesis, physical and chemical properties of alkanes, Isomerism and its effect on properties,Free radical substitutions; Halogenation, concept of relative reactivity v/s selectivity. General molecular formulae of cycloalkanes and relative stability, Baeyer strain theory.

Additional Input: Conformational analysis of alkanes. Cyclohexane conformations with energy diagram,Conformations of monosubstituted cyclohexane.

UNIT-II

Carbon-Carbon pi Bonds (Alkenes and Alkynes) **12h**

General methods of preparation, physical and chemical properties. Mechanism of E1, E2, E1cb reactions, Saytzeff and Hoffmann eliminations, Electrophonic Additions, mechanism (Markownikoff/Antimarkownik of addition) with suitable examples, *syn* and *anti*- addition; addition of HX. hydroboration-oxidation, ozonolysis, Diels Alder reaction, 1, 2- and1,4-addition reactions in conjugated dienes.

Reactions of alkynes; acidity, electrophilic and nucleophilic additions, hydration to form carbonyl compounds.

Additional Input: Oxy mercuration- demercuration and hydroxylation of Alkenes, Alkylation of terminal alkynes.

UNIT-III

Benzene and its reactivity **12h**

Concept of aromaticity, Huckel's rule - application to Benzenoid (Benzene, Naphthalene) andNon - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropyliumcation) Reactions - General mechanism of electrophilic aromatic substitution, mechanism of nitration, Friedel- Craft's alkylation and acylation. Orientation of aromatic substitution - ortho, para and meta directing groups. Ring activating and deactivating groups with examples Orientation of

i. Amino, methoxy and methyl groups.
ii. Carboxy, nitro, and sulphonic acid groups.

Additional Input: Orientation of Nitrile, Carbonyl Groups, Halogens.

GENERAL CHEMISTRY **24 h**

UNIT-IV

1. Surface chemistry and chemical bonding

a) Surface chemistry **6h**

Colloids- Coagulation of colloids- Hardy-Schulze rule. Stability of colloids, Protection of Colloids, Gold number.

Adsorption- Physical and chemical adsorption, Langmuir adsorption isotherm, applications of adsorption.

b) Chemical Bonding **6h**

Valence bond theory, hybridization, VB theory as applied to ClF_3**,** $Ni(CO)_4$**,** Molecular orbital theory -LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N_2, O_2, CO and NO).

Additional Input:

HSAB: Pearson's concept, HSAB principle & its importance, bonding in Hard-Hard and Soft-Soft combinations.

UNIT-V

Stereochemistry of carbon compounds **10h**

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae.

Optical isomerism: Optical activity- wave nature of light, plane polarized light, optical rotationand specific rotation.

Chiral molecules- definition and criteria(Symmetry elements)- Definition of enantiomers and diastereomers – Explanation of optical isomerism with examples- Glyceraldehyde, Lactic acid, Alanine, Tartaric acid, 2,3-dibromopentane. D, L, R,S and E,Z- configuration with examples.

Definition of Racemic mixture – Resolution of racemic mixtures (any 3 techniques).

Co-curricular activities and Assessment Methods

Continuous Evaluation: Monitoring the progress of student's learning Class Tests, Worksheets and Quizzes Presentations, Projects and Assignments and Group Discussions: Enhances critical thinking skills and personality Semester-end Examination: critical indicator of student's learning and teaching methods adopted byteachers throughout the semester.

List of

Reference

Books Theory:

Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (PearsonEducation).

Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). Eliel, E. L. &Wilen, S. H. Stereochemistry of Organic Compounds; Wiley: London, 1994. Kalsi, P. S. Stereochemistry Conformation and Mechanism; New Age International, 2005.

Practical:

Ahluwalia, V.K. &Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000).

Ahluwalia, V.K. &Dhingra, S. Comprehensive Practical Organic Chemistry: QualitativeAnalysis, University Press (2000).

Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)

Additional Resources:

Solomons, T. W. G.; Fryhle, C. B. &Snyder, S. A. Organic Chemistry, 12th Edition, Wiley.

Bruice, P. Y. Organic Chemistry, Eighth Edition, Pearson.

Clayden, J.; Greeves, N.&Warren, S. Organic Chemistry, Oxford.

Nasipuri, D. Stereochemistry of Organic Compounds: Principles and Applications, Third Edition, NewAge International.

Gunstone, F. D. Guidebook to Stereochemistry, Prentice Hall Press, 1975.

P. R. GOVERNMENT COLLEGE, KAKINADA
SYLLABUS FOR SEMESTER – I (CHEMISTRY)
Paper II (General & Organic Chemistry)

Weightage to content

S. No.	Course Content	Essay Questions (10M)	Short Answer Questions (5M)	Total No. Of Questions from each Unit	Total No. of Marks allotted to each Unit
	Organic Chemistry				
1	Unit - I	1	1	2	15
2	Unit - II	1	1	2	15
3	Unit - III	1	2	3	20
	General Chemistry				
4	Unit - IV	2	2	4	30
5	Unit - V	1	2	3	20
	TOTAL	**6**	**8**	**14**	**100**

LABORATORY COURSE-II **30**hrs (2 h / w)

Practical-II Volumetric Analysis

(At the end of Semester-II)

Course outcomes:

The end of the course, the student will be able to;

1. Use glassware, equipment and chemicals and follow experimental procedures in the laboratory
2. Understand and explain the volumetric analysis based on fundamental concepts learnt in ionic equilibria
3. Learn and identify the concepts of a standard solutions, primary and secondary standards
4. Facilitate the learner to make solutions of various molar concentrations. This may include: The concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration; Dilution of Solutions; Making different molar concentrations.

Volumetric analysis **50 M**

1. Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture.
2. Determination of Fe (II) using $KMnO_4$ with oxalic acid as primary standard.
3. Determination of Cu (II) using $Na_2S_2O_3$ with $K_2Cr_2O_7$ as primary standard.
4. Estimation of water of crystallization in Mohr's salt by titrating with $KMnO_4$

P. R. GOVERNMENT COLLEGE, KAKINADA
MODEL PAPER FOR SEMESTER – II
(CHEMISTRY)
Paper II (Physical & General Chemistry)

Duration: 2hrs. **Max. Marks: 50**

PART- A 4 X 5 = 20 Marks

Answer any Four of the following questions. Each carries FIVE marks

1. Question from Unit –I
2. Question from Unit –II
3. Question from Unit –III
4. Question from Unit – III
5. Question from Unit –IV
6. Question from Unit – IV
7. Question from Unit – V
8. Question from Unit – V

PART- B 3X 10 = 30 Marks

Answer Any Three questions. Each carries TEN marks

9. Question from Unit –I
10. Question from Unit –II
11. Question from Unit –III
12. Question from Unit –IV
13. Question from Unit –IV
14. Question from Unit – V

P. R. GOVERNMENT COLLEGE, KAKINADA

SEMESTER-II

CHEMISTRY Course-I: ORGANIC & GENERAL CHEMISTRY

Question bank

Unit – I

ESSAY QUESTIONS

1. Write any two preparation methods of alkanes and Explain Halogenation of alkanes?
2. Explain Baeyer Strain Theory?

SHORT ANSWER QUESTIONS

1. Explain concept of relative reactivity v/s selectivity in halogenations of alkanes?
2. Explain Free radical substitution reactions in alkanes?

Unit – II

ESSAY QUESTIONS

1. Write any two preparation methods and three chemical properties of alkenes?
2. Explain the mechanism of Markonikoff and Anti-Markonikoff addition of HBr to alkene?
3. Explain mechanism of E1 and E2 with suitable examples?

SHORT ANSWER QUESTIONS

1. Explain about Diel's – Alder reactions with examples?
2. Explain briefly Ozonolysis of alkenes?
3. Explain the acidity of1-alkynes?

Unit-III

ESSAY QUESTIONS

1. Define Huckels Rule? Explain Benzenoid and Non- Benzenoid Compounds with suitable Examples?

2. Explain electrophilic aromatic substitution in benzene with example?

SHORT ANSWER QUESTIONS

1. Explain the mechanisms of Nitration of Benzene?
2. Explain the mechanisms of Friedel-Craft's alkylation of Benzene
3. Explain the orientation effect of Methoxy group on mono substituted benzene

ESSAY QUESTIONS

Unit – IV

1. Derive Langmuir adsorption isotherm.
2. Draw the Molecular Orbital Energy diagram of N_2 and CO molecules and explain their bond order and magnetic behavior?

3. Draw the Molecular Orbital Energy diagram of O_2 and NO molecules and explain their bond order and magnetic behavior?

SHORT ANSWER QUESTIONS

1. Write the difference between Physical adsorption and Chemical adsorption.
2. Explain applications of adsorption.
3. Explain the structure of Ni $(CO)_4$ by Valence Bond theory?
4. Explain Protection of Colloids?

Unit – V

ESSAY QUESTIONS

1. Explain Cahn Ingold and Prelog rules for assigning R, S configuration to optically active molecules with examples
2. Define optical isomerism. Explain the optical isomerism in Lactic acid and tartaric acid.
3. Explain Cahn Ingold and Prelog rules for assigning E - Z configuration with examples.

SHORT ANSWER QUESTIONS

1. Draw Wedge and Fischer molecular representations with an example.
2. Define Optical activity and Specific rotation?
3. Explain D, L – Nomenclature with example?
4. Define Enantiomers and Diastereomers and give one example for each.