


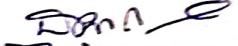
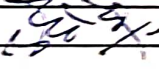

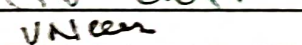

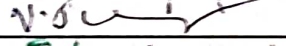
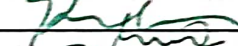



SRR & CVR GOVT DEGREE COLLEGE (A), VIJAYAWADA

DEPARTMENT OF CHEMISTRY

Minutes of the meeting of the board of studies

in the subject of Chemistry for V semester

The meeting of the Board of studies in the subject of Chemistry for V semester was held of 2nd Feb, 2019 in the Department of Chemistry, SRR & CVR Govt. Degree College (A), Vijayawada. The following members attended the meeting:

S.NO	NAME OF THE MEMBER	DESIGNATION	SIGNATURE
1.	K. Srinivas	Incharge of the Dept. & Chairman, BOS	
2.	Dr. D. Rama Sekhar Reddy	University Nominee	
3.	Dr. Md. Pacha	Subject expert	
4.	Dr. V. Sambsivaro	Subject expert	
5.	Dr. G. Venkatarao	Faculty Member	
6.	Dr. V. Neeraja	Faculty Member	
7.	Dr. G. Nagarjuna	Faculty Member	
8.	Dr. V. Phani Kumar	Faculty Member	
9.	K. V. S. Prasad	Faculty Member	
10.	G. V. Swaroop Singh	Faculty Member	
11.	Dr. Sudhasmsa Prabhakar	Faculty Member	

AGENDA:

Item 1: Approval of syllabus for Semester V for the academic year 2019-2020.

Item 2: Approval of Question paper, blue print and model paper.

Item 3: Approval of list of paper setters and examiners.


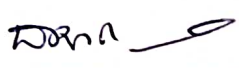

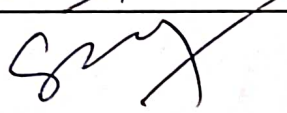

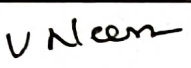



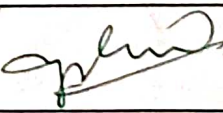
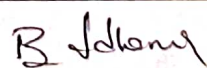
Item 4: Any other item with the approval of the chair.

The Chairperson, Board of Studies welcomed the members and initiated discussion on the syllabus for V semester. He apprised the members of the guidelines of the UGC and the CCE regarding the framing of syllabus and then recommended evaluation ratio for internal and external examinations. The members discussed in detail the various aspects presented before them and unanimously resolved the following:

RESOLUTIONS:

- ❖ Resolved to adopt the present University CBCS syllabus for semester V with the suggested modifications.
- ❖ Resolved to approve the division of marks for internal and external examinations along with the suggested blue print and model paper.
- ❖ Resolved to approve the list of paper setters' and examiners submitted by the department.

Syllabus for CBCS semester V**Question paper blue print for CBCS semester V****Model paper for CBCS semester V****List of paper setters and examiners**

S.N O	NAME OF THE MEMBER	DESIGNATION	SIGNATURE
1.	K. Srinivas	<i>Incharge of the Dept. & Chairman , BOS</i>	
2.	Dr. D. Rama Sekhar Reddy	<i>University Nominee</i>	
3.	Dr. Md. Pacha	<i>Subject expert</i>	
4.	Dr. V. Sambsivaro	<i>Subject expert</i>	
5.	Dr. G. Venkatarao	<i>Faculty Member</i>	
6.	Dr. V. Neeraja	<i>Faculty Member</i>	
7.	Dr. G. Nagarjuna	<i>Faculty Member</i>	
8.	Dr. V. Phani Kumar	<i>Faculty Member</i>	
9.	K. V. S. Prasad	<i>Faculty Member</i>	
10.	G. V. Swaroop Singh	<i>Faculty Member</i>	
11.	Dr. Sudhasmsa Prabhakar	<i>Faculty Member</i>	

SEMESTER-V
Paper - V (INORGANIC, PHYSICAL & ORGANIC CHEMISTRY) 45 hrs (3 h / w)
INORGANIC CHEMISTRY

UNIT - I

Coordination Chemistry:

8hrs

IUPAC nomenclature - Bonding theories - Review of Werner's theory and Sidgwick's concept of coordination - Valence bond theory - Geometries of coordination numbers 4-tetrahedral and square planar and 6-octahedral and its limitations, Crystal field theory - splitting of d-orbitals in octahedral, tetrahedral and square-planar complexes - low spin and high spin complexes - Factors affecting crystal-field splitting energy. Isomerism in coordination compounds - Structural isomerism and Stereo isomerism, stereochemistry of complexes with 4 and 6 coordination numbers.

UNIT-II

1. Spectral and magnetic properties of metal complexes: 4hrs

Types of magnetic behavior, spin-only formula, Calculation of magnetic moments, Experimental determination of magnetic susceptibility-Gouymethod.

2. Stability of metal complexes:

3hrs

Thermodynamic stability and kinetic stability, Factors affecting the stability of metal complexes, Chelate effect, Determination of composition of complex by Job's method and mole ratio method.

ORGANIC CHEMISTRY
UNIT- III

Nitro hydrocarbons:

3hrs

Classification of nitro hydrocarbons, Structure -Tautomerism of nitroalkanes leading to aci and keto form, Preparation of Nitroalkanes, Reactivity -Reaction with HONO (Nitrous acid), Nef reaction and Mannich reaction leading to Michael addition.

UNIT - IV

12hrs

Nitrogen compounds :

Amines (Aliphatic and Aromatic): Classification into 1°, 2°, 3° Amines and Quarternary ammonium compounds. Preparative methods - 1. Ammonolysis of alkyl halides 2. Gabriel synthesis 3. Hoffman's bromamide reaction (mechanism). Reduction of Amides and Schmidt reaction.

Physical properties and basic character - Comparative basic strength of Ammonia, methyl amine, dimethyl amine, trimethyl amine and aniline - comparative basic strength of aniline, N-methylaniline and N,N-dimethyl aniline (in aqueous and non-aqueous medium), steric effects and substituent effects.

Chemical properties: a) Alkylation b) Acylation c) Carbylamine reaction d) Hinsberg separation e) Reaction with Nitrous acid of 1°, 2°, 3° (Aliphatic and aromatic amines).

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PHYSICAL CHEMISTRY

UNIT- V

Thermodynamics

15hrs

The first law of thermodynamics-statement, definition of Internal energy and enthalpy.

Heat capacities and their relationship. Joule-Thomson effect- coefficient.

Calculation of Maximum Work done(W)for the expansion of perfect gas under isothermal and adiabatic conditions for reversible processes.

Temperature dependence of enthalpy of formation-Kirchoff's equation.

Second law of thermodynamics. Different Statements of the law. Carnot cycle and its efficiency. Concept of entropy, entropy as a state function, entropy changes in reversible and irreversible processes. Entropy changes in spontaneous and equilibrium processes.

List of Reference Books

1. Concise coordination chemistry by Gopalan and Ramalingam
2. Coordination Chemistry by Basalo and Johnson
3. Organic Chemistry by G.Mare loudan, Purdue University
4. Advanced Physical Chemistry by Bahl & Tuli
5. Text book of physical chemistry by S Glasstone
6. Concise Inorganic Chemistry by J.D.Lee
7. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan
8. A Text Book of Organic Chemistry by Bahl and Arun bahl
9. A Text Book of Organic chemistry by I L Finar Vol I
10. Advanced physical chemistry by Gurudeep Raj.

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**SRR & CVR GOVT. DEGREE COLLEGE (AUTONOMOUS),
VIJAYAWADA.**

Paper - V (INORGANIC, PHYSICAL & ORGANIC CHEMISTRY)
45 hrs (3 h / w)

WEIGHTAGE TO CONTENT

UNIT	NAME OF THE CHAPTER	ESSAY (08M)	SHORT ANSWER (04M)
I	Coordination Chemistry	1	2
II	1. Spectral and Magnetic Properties of metal complexes	1	1
	2. Stability of metal complexes		1
III	Nitro Hydrocarbons	1	2
IV	Nitrogen compounds	1	2
V	Thermodynamics	1	2

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SRR & CVR GOVT. DEGREE COLLEGE (AUTONOMOUS) VIJAYAWADA

PAPER-V : INORGANIC, ORGANIC & PHYSICAL CHEMISTRY

Semester-V

Time : 3 Hrs

Max. Marks : 60

Section-A

Answer any FIVE Questions.

4 X 5 = 20 Marks

1. Explain magnetic behavior of complexes.
2. Explain EAN with one example.
3. What is Chelate effect? Give example.
4. What is spin only formula? Give its significance.
5. Explain Michael addition.
6. Write briefly about aci and keto forms of Nitro Alkanes.
7. Write Carbyl amine reaction.
8. Compare basic strength of aliphatic amines.
9. Derive Work done in an isothermal reversible expansion of ideal gas.
10. Derive $C_p - C_v = R$.

Section-B

Answer ALL Questions.

5 x 8 = 40 Marks

11. Explain Crystal Field theory. Explain Splitting of crystal field in Octahedral and Tetrahedral complexes.

OR

12. Write note on Stereochemistry of complexes with 4 and 6 coordination numbers.

13. What is magnetic moment? Write experimental determination of magnetic susceptibility- GUOY method.

OR

14. Explain determination of composition of complexes by Job's method and mole ratio method.

15. Write any two methods of preparation of Nitro alkanes. Explain how their reactivity differs with Nitrous acid.

OR

16. (a) Explain the classification of Nitro hydrocarbons.

- (b) What is Tautomerism? Explain Tautomerism of Nitroalkanes.

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Middle: "Don't" written above a horizontal line.
Right side: "G.V. cuttle" written above a horizontal line, with "V.B." written below it. To the right of this, "V.N. An" is written above a signature, and "B. Shree" is written below another signature.

LABORATORY COURSE – V
Practical Paper – V Organic Chemistry (at the end of semester V)
30 hrs (3h / W)

Organic Qualitative Analysis:

50 M

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

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

LABORATORY COURSE – VI
Practical Paper – VI Physical Chemistry (at the end of semester V)
30 hrs (3 h / W)

1. Determination of rate constant for acid catalyzed ester hydrolysis.
2. Determination of molecular status and partition coefficient of benzoic acid in Benzene and water.
3. Determination of Surface tension of liquid
4. Determination of Viscosity of liquid.

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**SRR & CVR GOVT. DEGREE COLLEGE(AUTONOMOUS),
VIJAYAWADA.**

Paper - VI (INORGANIC, ORGANIC & PHYSICAL CHEMISTRY)
45 hrs (3 h / w)

WEIGHTAGE TO CONTENT

UNIT	NAME OF THE CHAPTER	ESSAY (08M)	SHORT ANSWER (04M)
I	1. Reactivity of metal complexes	1	1
	2. Bioinorganic chemistry		1
II	1. Chemical Kinetics	1	1
	2. PhotoChemistry		1
III	Heterocyclic Compounds	1	2
IV	Carbohydrates	1	2
V	Amino acids	1	2

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SEMESTER-V
Paper - VI (INORGANIC, ORGANIC & PHYSICAL CHEMISTRY) 45 hrs (3 h / w)

INORGANIC CHEMISTRY
UNIT-I

- 1. Reactivity of metal complexes:** 4hrs
Labile and inert complexes, ligand substitution reactions - S_N1 and S_N2 , substitution reactions of square planar complexes - Trans effect and applications of trans effect.
- 2. Bioinorganic chemistry:** 4hrs

Essential elements, biological significance of Na, K, Mg, Ca, Fe, Co, Ni, Cu, Zn and Cl-

PHYSICAL CHEMISTRY
UNIT-II

- 1. Chemical Kinetics** 8 hrs

Rate of reaction - Definition of order and molecularity. Derivation of rate constants for first, and zero order reactions and examples. Derivation for time half change. Methods to determine the order of reactions. Effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy.

- 2. PhotoChemistry** 5 hrs

Difference between thermal and photochemical processes. Laws of photochemistry- Grothus-Draper's law and Stark-Einstein's law of photochemical equivalence. Quantum yield-Photochemical reaction mechanism- hydrogen- chlorine, hydrogen-bromine reaction. Qualitative description of fluorescence, phosphorescence.

ORGANIC CHEMISTRY
UNIT- III

- Heterocyclic Compounds** 7 hrs

Introduction and definition: Simple five membered ring compounds with one hetero atom Ex. Furan. Thiophene and pyrrole - Aromatic character - Preparation from 1,4,-dicarbonyl compounds(Paul-Knorr synthesis).

Properties : Acidic character of pyrrole - electrophillic substitution at 2 or 5 position, Halogenation, Nitration and Sulphonation under mild conditions - Diels Alder reaction in furan.

Pyridine - Structure - Basicity - Aromaticity - Chichibabin Reaction.

UNIT-IV

- Carbohydrates** 8 hrs

Monosaccharides: (+) Glucose (aldo hexose) Fructose(keto hexose) - Evidence for cyclic structure of glucose (some negative aldehydes tests and mutarotation) -

Pyranose structure (Haworth formula and chair conformational formula).

Osazone formation from glucose and fructose - Definition of anomers with examples.

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Interconversion of Monosaccharides: Aldopentose to Aldohexose (Arabinose to D-Glucose, D-Mannose) (Killiani - Fischer method).

Epimers, Epimerisation - Lobry de bruyn van Ekenstein rearrangement.

Aldohexose to Aldopentose (D-Glucose to D- Arabinose) by Ruff degradation.

Aldohexose to Ketohexose [(+) Glucose to (-) Fructose] and Ketohexose to Aldohexose (Fructose to Glucose).

UNIT- V

Amino acids

7 hrs

Introduction: Definition of Amino acids, classification of Amino acids into alpha, beta, and gamma amino acids. Natural and essential amino acids - definition and examples, classification of alpha amino acids into acidic, basic and neutral amino acids with examples. Methods of synthesis: General methods of synthesis of alpha amino acids (specific examples - Glycine, Alanine, valine and leucine) by following methods: a) from halogenated carboxylic acid b) Malonic ester synthesis c) strecker's synthesis.

Physical properties: Zwitter ion structure - salt like character - solubility, melting points, amphoteric character, definition of isoelectric point.

Chemical properties: General reactions due to amino and carboxyl groups - lactams from gamma and delta amino acids by heating peptide bond (amide linkage).

List of Reference Books

1. Concise coordination chemistry by Gopalan and Ramalingam
2. Coordination Chemistry by Basalo and Johnson
3. Organic Chemistry by G.Mare loudan, Purdue University
4. Advanced Physical Chemistry by Atkins
5. Text book of Physical Chemistry by S Glasstone
7. Instrumentation and Techniques by Chatwal and Anand
8. Essentials of Nano Chemistry by pradeep
9. A Textbook of Physical Chemistry by Puri and Sharma
10. Advanced Physical chemistry by Gurudeep Raj

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SRR & CVR GOVT. DEGREE COLLEGE (AUTONOMOUS) VIJAYAWADA

PAPER-VI : INORGANIC, ORGANIC & PHYSICAL CHEMISTRY

Semester-V

Time : 3 Hrs

Max. Marks : 60

Section-A

Answer any FIVE Questions.

4 X 5 = 20 Marks

1. What are Labile and Inert complexes? Explain with examples.
2. Explain the biological significance of Na, K and Cu.
3. What is half life? Derive the expression for time and half change.
4. What is Activation energy? Give its significance.
5. Explain Fluorescence and Phosphorescence.
6. Write notes on Jablonski diagram.
7. Acidic character of Pyrrole.
8. Diels-Alder Reaction.
9. What are Lactams? Explain their formation.
10. Malonic ester synthesis of amino acids.

Section-B

Answer ALL Questions.

5 x 8 = 40 Marks

11. What are Ligand substitution reactions? Give SN^1 and SN^2 reactions with examples.

OR

12. Give the biological significance of Na, Mg, Fe, Co, Ni and Zn.

13. What is 1st order reaction. Derive the rate expression for 1st order reaction.

OR

14. Give any 4 methods to determine the order of reactions.

15. Write the laws of Photochemistry and determination of Quantum yield of a reaction.

OR

16. Explain with examples the reactions having low and high Quantum yield with reasons.

17. Explain why substitution reactions take place at 2,5 positions in Furan, thiophene and Pyrrole.

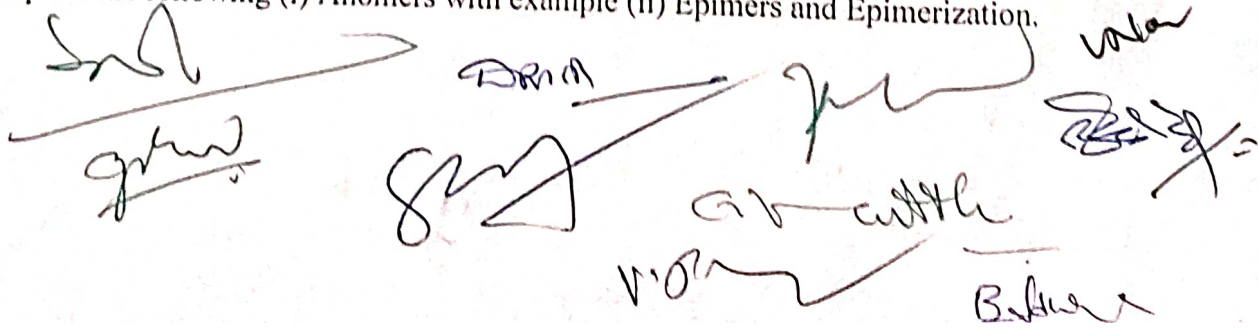
OR

18. Discuss the acidic character of Pyrrole.

19. Explain cyclic structure of Glucose. Give Haworth's formula and chair conformational formula.

OR

20. Explain the following (i) Anomers with example (ii) Epimers and Epimerization.



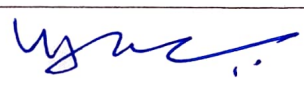


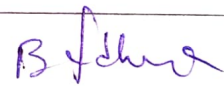
S.R.R. & C.V.R. GOVT DEGREE COLLEGE (Autonomous), VIJAYAWADA

DEPARTMENT OF CHEMISTRY

Minutes of the meeting of the board of studies

In the subject of Chemistry for VI Semester

The meeting of the Board of studies in the subject of Chemistry for VI semester was held on 4th September 2019 in the Department of Chemistry, SRR & CVR Govt. Degree College (A), Vijayawada. The following members attended the meeting:

S.No.	Name of the Member	Designation	Signature
1	Dr.V.Neeraja	Incharge of the Dept. & Chairman, BOS	
2.	Dr.D.Rama Sekhar Reddy	University Nominee	
3.	Dr.Y.Hanumatha Rao	Subject expert	
4.	Dr.Bhaskara Rao	Subject expert	
5.	K.V.S.Prasad	Faculty Member	
6.	Dr.G.Nagarjuna	Faculty Member	
7.	Dr.V.Phani Kumar	Faculty Member	
8.	G.V.Swaroop Singh	Faculty Member	
9.	Dr.Sudhasmsa Prabhakar	Faculty Member	
10.	Ch.Siva Prasad	Faculty Member	

AGENDA:

Item 1 : Approval of syllabus for Semester VI for the academic year 2019-2020.

Item 2 : Approval of Question paper, blue print and model paper

Item 3 : Approval of list of paper setters and examiners

Item 4 : Any other item with the approval of the chair

The Chairperson, Board of Studies welcomed the members and initiated discussion on the syllabus for VI semester. He appraised the members of the guidelines of the UGC and the CCE regarding the framing of syllabus and then recommended evaluation ratio for internal and external examinations. The members discussed in detail the various aspects presented before them and unanimously resolved the following:

RESOLUTIONS:

- Resolved to adopt the present University CBCS syllabus for semester VI with the suggested modifications.
- Resolved to approve the division of marks for internal and external examinations along with the suggested blue print and model paper
- Resolved to approve the list of paper setters' sand examiners submitted by the department.

Syllabus for CBCS semester VI
Question paper blue print for CBCS semester VI
Model Paper for CBCS semester VI
List of paper setters and examiners

S.No.	Name of the Member	Designation	Signature
1	Dr.V.Neeraja	Incharge of the Dept. & Chairman, BOS	
2.	Dr.D.Rama Sekhar Reddy	University Nominee	u
3.	Dr.Y.Hanumatha Rao	Subject expert	Y. Hanumatha Rao
4.	Dr.Bhaskara Rao	Subject expert	Bhaskara Rao
5.	K.V.S.Prasad	Faculty Member	
6.	Dr.G.Nagarjuna	Faculty Member	
7.	Dr.V.Phani Kumar	Faculty Member	V. Phanikumar
8.	G.V.Swaroop Singh	Faculty Member	
9.	Dr.Sudhasmsa Prabhakar	Faculty Member	
10.	Ch.Siva Prasad	Faculty Member	

SRR&CVR GOVERNMENT DEGREE COLLEGE (A),**VIJAYAWADA****B.Sc. Chemistry Syllabus under CBCS****VI SEMESTER (w. e. f. 2019-20)****STRUCTURE OF CHEMISTRY SYLLABUS UNDER CBCS**

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS
III	VI *Any one Paper from VII A or B	VII (A)*	Elective A	100	03
			Practical - VII A	50	02
		VII (B)*	Elective B	100	03
			Practical - VII B	50	02
	VI ** Any one cluster from VIII, A or B	VIII (A)**	Cluster Elective - I		
			VIII-A-1	100	03
			VIII-A-2	100	03
			VIII-A-3	100	03
			PRACTICAL	50	02
			PRACTICAL	50	02
			PROJECT	50	02
		VIII (B)**	Cluster Elective- II		
			VIII-B-1	100	03
			VIII- B-2	100	03
			VIII-B-3	100	03
			PRACTICAL	50	02
			PRACTICAL	50	02
			PROJECT	50	02

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SEMESTER-VI - Electives
ELECTIVE Paper – VII : ANALYTICAL METHODS
IN CHEMISTRY

45hrs (3h / w)

UNIT-I

Quantitative analysis:

10h

a) Importance in various fields of science, steps involved in chemical analysis. Principles of volumetric analysis ∴ Theories of acid-base, redox, complexometric, iodometric and precipitation titrations - choice of indicators for these titrations.

UNIT-II

Treatment of analytical data:

7h

Types of errors, significant figures and its importance, accuracy - methods of expressing accuracy, error analysis and minimization of errors, precision - methods of expressing precision, standard deviation and confidence limit.

UNIT-III

SEPARATION TECHNIQUES IN CHEMICAL ANALYSIS:

8h

SOLVENT EXTRACTION : Introduction, principle, techniques, factors affecting solvent extraction, Batch extraction, continuous extraction and counter current extraction.

ION EXCHANGE : Introduction, action of ion exchange resins, separation of inorganic mixtures, applications.

UNIT - IV

10h

Chromatography: Classification of chromatography methods, principles of differential migration adsorption phenomenon, Nature of adsorbents, solvent systems, R_f values, factors effecting R_f values.

Paper Chromatography: Principles, R_f values, experimental procedures, choice of paper and solvent systems, developments of chromatogram - ascending, descending and radial. Two dimensional chromatography, applications.

UNIT - V

10h

Thin layer Chromatography (TLC): Advantages. Principles, factors effecting R_f values. Experimental procedures. Adsorbents and solvents. Preparation of plates. Development of the chromatogram. Detection of the spots. Applications.

Column Chromatography: Principles, experimental procedures, Stationary and mobile Phases, Separation technique. Applications

HPLC : Basic principles and applications.

List of Reference Books

1. Analytical Chemistry by Skoog and Miller
2. A textbook of qualitative inorganic analysis by A.I. Vogel
3. Nanochemistry by Geoffrey Ozin and Andre Arsenault
4. Stereochemistry by D. Nasipuri
5. Organic Chemistry by Clayden

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S.R.R. & C.V.R. GOVT DEGREE COLLEGE (Autonomous)

VIJAYAWADA

PAPER – VII (A) – ELECTIVE PAPER

ANALYTICAL MEHTODS IN CHEMISTRY

Weightage of Marks (Blue Print)

Sl.No.	Name of the Topic	Essay	Short Questions
1.	Unit-I : Quantitative Analysis	2	2
2	Unit-II : Treatment of Analytical data	2	2
3.	Unit-III : Separation Techniques in Chemical Analysis	2	2
4.	Unit-IV : Chromatography	2	2
5.	Thin Layer Chromatography	2	2

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S.R.R. & C.V.R. GOVT DEGREE COLLEGE (Autonomous) -VIJAYAWADA

**SEMESTER – VI
ELECTIVE PAPER – VII (A)**

ANALYTICAL METHODS IN CHEMISTRY

Model Question Paper

Time : 3 Hours

Max.Marks : 60

Section – A

Answer any five questions

5 x 4 = 20 Marks

1. Explain Iodometric titrations with suitable examples
2. Define accuracy and precision
3. Write short note on Batch extraction
4. Write one method of expressing precision
5. Explain stationary phase and mobile phase
6. Explain principles of volumetric analysis
7. Write about solvent extraction
8. Write about applications of HPLC
9. What is descending paper chromatography
10. What is R_f Value ? Give Factors effecting R_f Values

Section – B

Answer 5 questions

5 x 8 = 40 Marks

11. Write about EDTA Titrations
OR
12. Explain choice of indicators in redox, acid base and complexometric titrations.
13. Give an account of significant figures and their importance
OR
14. Explain standard deviation and confidence limit
15. Explain how inorganic mixtures are separated Ion exchange method
OR
16. Write notes on (a) Continuous extraction (b) estimation of Fe^{3+} ion using solvent extraction.
17. Explain the experimental details of paper chromatography and its applications.
OR
18. Give the description of column chromatography
19. Explain thin layer chromatography and its applications
OR
20. Write note on (a) HPLC (b) Solvent systems

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SEMESTER – VI
ELECTIVE PAPER – VII-(B) : ENVIRONMENTAL CHEMISTRY

45 hrs (3 h / w)

UNIT-I

9 h

Introduction

Concept of Environmental Chemistry – Nomenclature of environmental chemistry – Segments of environment – Natural resources – Renewable Resources – Solar and biomass energy and Nonrenewable resources – Thermal power and atomic energy – Reactions of atmospheric Oxygen and Hydrological cycle.

Additional Inputs: Environmental management

UNIT – II

9 h

Air Pollution

Definition – Sources of Air Pollution – Classification of air pollution – Acid rain – Photochemical smog – Green house effect – Formation and depletion of ozone – Bhopal Gas disaster – Controlling methods of air pollution.

UNIT – III

Water Pollution

9 h

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

UNIT – IV

Chemical Toxicology

9 h

Toxic chemicals in the environment – effects of toxic chemicals – cyanide and its toxic effects – pesticides and its biochemical effect – toxicity of lead, mercury, arsenic and cadmium.

Additional Inputs : Carcinogens

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UNIT – V

Ecosystem and biodiversity

Ecosystem

9 h

Concepts – structure – Functions and types of ecosystem – Abiotic and biotic components – Energy flow and Energy dynamics of ecosystem – Food chains – Food web – Tropic levels – Biogeochemical cycles (carbon, nitrogen and phosphorus)

Biodiversity

Definition – level and types of biodiversity – concept – significance – magnitude and distribution of biodiversity – trends – biogeographical classification of India – biodiversity at national, global and regional level.

Additional Inputs: Threat to biodiversity, Conservation of biodiversity.

List of Reference books

1. Fundamentals of ecology by M.C.Dash
2. A Text book of Environmental Chemistry by W.Moore and F.A.Moore
3. Environmental Chemistry by Samir K.Banerji
4. Environmental Chemistry by AKDEY

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F.A. Moore

S.R.R. & C.V.R. GOVT DEGREE COLLEGE (Autonomous)

VIJAYAWADA

PAPER – VII B – ELECTIVE PAPER

ENVIRONMENTAL CHEMISTRY

Weightage of Marks (Blue Print)

Sl.No.	Name of the Topic	Essay	Short Questions
1.	Unit-I : Introduction	2	2
2	Unit-II : Air Pollution	2	2
3.	Unit-III : Water Pollution	2	2
4.	Unit-IV : Chemical Toxicity	2	2
5.	Unit-V : Ecosystem & Biodiversity	2	2
	Total :	10	10

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S.R.R. & C.V.R. GOVT DEGREE COLLEGE (Autonomous) -VIJAYAWADA

ELECTIVE PAPER – VII (B)

ENVIRONMENTAL CHEMISTRY

Model Question Paper

Time : 3 Hours

Max.Marks : 60

Section – A

Answer any five questions

5 x 4 = 20 Marks

1. What are the different segments of Environment?
2. What is TDS ? How is it Measured?
3. What is alkalinity of water? How it is determined.
4. Write short notes on acid rain
5. Discuss the toxic effects of Lead and Mercury.
6. Explain about energy flow and energy dynamics I ecosystem.
7. Write short notes on hydrological cycle.
8. Explain briefly depletion of ozone layer.
9. Discuss briefly about carcinogens.
10. Explain conservation of biodiversity.

Section – B

Answer 5 questions

5 x 8 = 40 Marks

11. How does atmosphere Oxygen helps in producing energy
OR
12. Give Nomenclature of Environmental chemistry
13. Explain the classification of Air pollutions and mention some air pollutants.
OR
14. Explain about (a) Photochemical smog (b) Green house effect.
15. Explain any two methods of converting hard water into soft water
OR
16. Explain about (a) DO (b) BOD and (c) COD
17. Mention any four toxic chemicals in the environment discuss their harmful effects.
OR
18. Explain the toxic effects of (a) Cyanide and (b) Pesticides
19. Explain the functions and types of Ecosystem
OR
20. What is biodiversity? Explain its level and types of Biodiversity.

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Cluster Elective –I
ORGANIC
PAPER – VIII-A 1 : ORGANIC SPECTROSCOPIC TECHNIQUES
45 hrs (3 h / w)

UNIT-I

10h

NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY

Nuclear spin, Principles of NMR, Magnetic moment and Spin angular momentum. Larmor Frequency, Instrumentation. Relaxation Spin-spin & spin lattice relaxation. Shielding constants, Chemical shifts, Shielding and De shielding mechanism-Factors influencing Chemical shift. Spin-Spin interactions- AX, AX₂ and AB types. Vicinal, Geminal and Long range coupling- Factors influencing coupling constants.

UNIT – II

5h

Spin decoupling, Spin tickling, Deuterium exchange, Chemical shift reagents and Nuclear overhauser effect. Applications in Medical diagnostics, FT NMR and its Advantages.

UNIT-III

10h

UV & VISIBLE SPECTROSCOPY

The Born-Oppenheimer approximation , Vibrational coarse structure: Bond association and Bond sequence. Intensity of Vibrational-electronic spectra: The Franck-Condon principle. Types of transitions, Chromophores, Conjugated dienes, trienes and polyenes, unsaturated carbonyl compounds-Woodward – Fieser rules.

UNIT-IV

5h

Beer-Lambert's Law. Deviation from Beer's law. Quantitative determination of metal ions (Mn⁺², Fe⁺², NO₂⁻¹, Pb⁺²). Simultaneous determination of Chromium and Manganese in a mixture.

UNIT-V

15h

ELECTRON SPIN RESONANCE SPECTROSCOPY

Basic Principles, Theory of ESR, Comparison of NMR & ESR., Factors affecting the 'g' value, determination of 'g' value. Isotropic and Anisotropic constants. Hyper fine splitting coupling constants. Zero field splitting and Kramer degeneracy.

Applications:- Detection of free radicals; ESR spectra of (a) Methyl radical (CH₃•), (b) Benzene anion (C₆H₆⁻) (c) Isoquinine (d) [Cu(H₂O)₆]⁺² (e) [Fe(CN)₅NO]⁻³

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REFERENCE BOOKS:

1. Electron Spin Resonance Elementary Theory and Practical Applications- John E. Wertz and James R. Bolton, Chapman and Hall, 1986.
2. Spectroscopic Identification of Organic compounds – Silverstein, Basseler and Morrill.
3. Organic Spectroscopy- William Kemp.
4. Fundamentals of Molecular Spectroscopy- C. N. Banwell and E.A. McCash 4th Edition, Tata Mc Graw Hill Publishing Co., Ltd. 1994.
5. Physical Methods in Inorganic Chemistry – R.S.Drago, Saunders Publications.
6. NMR, NQR, EPR and Mössbauer Spectroscopy in Inorganic chemistry – R.V Parish, Ellis, Harwood.
7. Instrumental Methods of Chemical Analysis- H.Kaur, Pragathi Prakashan, 2003.
8. Instrumental Methods of Analysis, 7th Edition – Willard, Merrit, Dean, Settle, CBS Publications, 1986.
9. Molecular Structure and Spectroscopy – G. Aruldas, Prentice Hall of India Pvt.Ltd, New Delhi, 2001.
10. Coordination Chemistry: Experimental Methods- K. Burger, London Butter Worths, 1973.
11. Analytical spectroscopy – Kamlesh Bansal, Campus Books, 2008.

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I. LABORATORY COURSE – VIII

Practical Paper – VIII-A-1: (At The End of Semester VI) 30 hrs (2 h / W)

1. Preparation of Aspirin.
2. Preparation of Paracetamol.
3. Preparation of Acetanilide.
4. Preparation of Barbutiric Acid.
5. Preparation of Phenyl Azo β -naphthol.

II. LABORATORY COURSE – VIII

Practical Paper – VIII-A-2 (At The End of Semester VI) 30 hrs (2 h / W)

1. Green procedure for organic qualitative analysis: Detection of N, S and halogens
2. Acetylation of 10 amine by green method: Preparation of acetanilide
3. Rearrangement reaction in green conditions: Benzil-Benzilic acid rearrangement
4. Electrophilic aromatic substitution reaction: Nitration of phenol
5. Radical coupling reaction: Preparation of 1,1-bis -2-naphthol
6. Green oxidation reaction: Synthesis of adipic acid
7. Green procedure for Diels Alder reaction between furan and maleic anhydride.

III. Practical:- Project Work

List of Reference Books

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

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Cluster Elective –I
ORGANIC
PAPER – VIII-A 1 : ORGANIC SPECTROSCOPIC TECHNIQUES
BLUE PRINT

WEIGHTAGE OF MARKS

S. No	NAME OF THE TOPIC/UNIT	ESSAY QUESTIONS	SHORT ANSWER QUESTIONS
1	UNIT-I Nuclear Magnetic Resonance Spectroscopy	2	2
2	UNIT-II	2	2
3	UNIT-III UV & Visible Spectroscopy	2	2
4	UNIT-IV	2	2
5	UNIT-V Electron Spin Resonance Spectroscopy	2	2

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SRR&CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA

B.Sc CHEMISTRY (CLUSTER ELECTIVE –III) VI SEMESTER

ORGANIC PAPER – VIII-A 1

ORGANIC SPECTROSCOPIC TECHNIQUES

TIME: 3 HOURS

MAX MARKS: 60

SECTION –A (SHORT ANSWER QUESTIONS)

Answer Any Five of the following.

5 X 4 = 20 Marks

1. Explain Larmour Frequency.
2. Explain Vicinal and Geminal Coupling.
3. Explain Spin Decoupling.
4. Explain Chemical Shift Reagents with examples.
5. Explain Born- Oppenheimer Approximation.
6. Explain Frank Condon Principle.
7. Explain the deviations of Beer-Lambert's Law.
8. Explain the quantitative determination of NO_2^{-1} ion using Beer-Lambert's Law.
9. Explain the ESR spectrum of Methyl radical.
10. Explain factors affecting "g" value.

SECTION –B (ESSAY QUESTIONS)

Answer Any Five of the following.

5 X 8 = 40 Marks

UNIT-I

11. Explain the Shielding and Deshielding Mechanism and write the factors influencing them.

OR

12. What is Spin-Spin Interaction? Explain Spin-Spin Interaction in AX and AB types of molecules.

UNIT-II

13. What is Nuclear Overhauser Effect? Write the applications of NOE in medical medical diagnosis.

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14. What is FT NMR technique? Write its advantages over NMR.

UNIT-III

15. Explain Frank- Condon Principle. Explain Vibrational Coarse structure of molecules.

OR

16. Write the Woodward-Fieser rules for the calculation of λ_{max} of unsaturated carbonyl compounds with an example.

UNIT-IV

17. Explain Beer- Lambert's law and explain its deviations from Beer's law.

OR

18. Explain the quantitative determination of Mn^{+2} and Fe^{+2} ions using Beer- Lambert's law.

UNIT-V

19. Explain Hyper field splitting in ESR Spectroscopy.

OR

20. Compare NMR with ESR Spectroscopy.

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UNIT – I

9 hours

ORGANIC PHOTOCHEMISTRY: Organic photo chemistry: Molecular orbitals, carbonyl chromophore-triplet states, Jablonski diagram, inter-system crossing. Energy transfer. Energies properties and reaction of singlet and triplet states of and transitions. Photochemical reactions: (a) Photoreduction, mechanism, Applications,

Additional Inputs: (b) Paterno Buchi Reaction, Mechanism, Application

UNIT – II

9 hours

ORGANIC PHOTOCHEMISTRY: Norrish cleavages, type I: Mechanism, Norrish type II cleavage: Mechanism and stereochemistry, type II reactions of esters, 1,2-diketones, Di - π methane rearrangement, Photo Fries rearrangement, Photochemistry of conjugated dienes, Decomposition of nitrites – Barton reaction.

Additional Inputs: Photo Chemistry of aromatic compounds.

UNIT – III

9 hours

PROTECTING GROUPS AND ORGANIC REACTIONS: Principles of (1) Protection of alcohols – ether formation including silyl ethers – ester formation, (2) Protection of carboxylic acids – ester formation, benzyl and t-butyl esters, (3) Protection of amines – acetylation, benzylation, benzyloxy carbonyl, triphenyl methyl groups and fmoc, (4) Protection of carbonyl groups – acetal, ketal, 1,2-glycols and 1,2-dithioglycols formation.

UNIT – IV

9 hours

SYNTHETIC REACTIONS: Mannich reaction - Mannich bases, Robinson ring annulations. The Shapiro reaction, Stork-enamine reaction. Wittig reaction.

Additional Input: Hoff-man rearrangement, Diels alder reaction, stereo chemistry, sulphur ylides.

UNIT – V

9 hours

NEW SYNTHETIC REACTIONS McMurrey reaction, Peterson's stereoselective olefination, Heck reaction, Suzuki coupling, Stille coupling and Sonogishira coupling.

Additional Input: Bayer Villiger oxidation, Schmidt Reaction, Simmons-Smith reaction, Birch reduction, Claisen rearrangement, Favorskii rearrangement.

Recommended Books

1. Molecular reactions and Photochemistry by Charles Dupey and O.L. Chapman.
2. Molecular Photochemistry by Turru.
3. Importance of antibonding orbitals by Jaffe and Orchin.
4. Text Book of Organic Chemistry by Cram., Hammand and Henrickson.
5. Some modern methods of organic synthesis by W. Carruthers.
6. Guide Book to Organic Synthesis by R.K. Meckie, D.M. Smith and R.A. Atken.
7. Organic Synthesis by O.House.
8. Organic synthesis by Michael B. Smith.
9. Organic Chemistry Claydon and others 2005.
10. Name Reactions by Jie Jack Li
11. Reagents in Organic synthesis by B.P. Mundy and others.

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SRR & CVR GOVT. DEGREE COLLEGE (A) :: VIJAYAWADA
CLUSTER-2

ORGANIC PAPER – VIII-A-2
ADVANCED ORGANIC REACTIONS
Weightage of marks (Blue Print)

S.No	Name of the Topic	Essay Questions	Short Questions
1	Unit- 1 ORGANIC PHOTOCHEMISTRY	2	2
2	Unit- 2 ORGANIC PHOTOCHEMISTRY	2	2
3	Unit- 3 PROTECTING GROUPS AND ORGANIC REACTIONS	2	2
4	Unit- 4 SYNTHETIC REACTIONS	2	2
5	Unit- 5 NEW SYNTHETIC REACTIONS	2	2
Total		10	10

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SRR & CVR GOVT. DEGREE COLLEGE (A) :: VIJAYAWADA
CLUSTER-2
ORGANIC PAPER – VIII-A-2
ADVANCED ORGANIC REACTIONS
MODEL PAPER

Max. Marks: 60

Time : 3hr

PART-A

I. Answer any Five Questions

5x4=20 Marks

1. Explain the terms Intersystem crossing, fluorescence.
2. What is Di - π methane rearrangement? Give example.
3. Explain the protection of amines using fmoc.
4. What is Shapiro reaction? Give equation.
5. What is Wittig reaction? Give equation.
6. What is Barton reaction? Give equation.
7. What is Simmons-Smith reaction?
8. Write about Favorskii rearrangement with one example.
9. Explain the protection & de protection of carboxylic acids by using benzyl ester.
10. Write the mechanism of Photo Reduction.

PART - B

II. Answer all the Questions

5x8=40 Marks

11. Explain in detail the Jablonski diagram.
(or)
12. Write Paterno Buchi Reaction, Mechanism and Application.
13. Explain Norrish type II cleavage with mechanism.
(or)
14. Explain the Photo chemistry of aromatic compounds.
15. Explain the protection & deprotection of Alcohols
I) Ether formation II) ester formation
(or)
16. Explain the protection & deprotection of carbonyl groups
17. Explain the Mannich reaction with mechanism.
(or)
18. Explain the Stork-enamine reaction with mechanism.
19. Explain the McMurry reaction & Heck reaction.
(or)
20. Explain the Birch reduction and Favorskii rearrangement.

**SRR & CVR GOVT. DEGREE COLLEGE, (AUTONOMOUS),
VIJAYAWADA
Cluster Elective - ~~III~~ I
ORGANIC
PAPER – VIII-A 3 : PHARMACEUTICAL AND MEDICINAL CHEMISTRY
45 hrs (3 h / w)
SYLLABUS**

UNIT-I **8h**

Pharmaceutical Chemistry Terminology: Pharmacy, Pharmacology, Pharmacophore, Pharmacodynamics, Pharmacokinetics (ADME, Receptors - brief treatment) Metabolites and Anti metabolites.

UNIT – II

Drugs: **8h**

Nomenclature: Chemical name, Generic name and trade names with examples Classification: Classification based on structures and therapeutic activity with one example each, Administration of drugs

UNIT-III

Synthesis and therapeutic activity of the compounds: **12h**

a. Chemotherapeutic Drugs

1. Sulphad drugs (Sulphamethoxazole) 2. Antibiotics - β -Lactam Antibiotics,

b. Psycho therapeutic Drugs: 1. Anti pyretics (Paracetamol) 2. Hypnotics,

3. Tranquilizers (Diazepam) 4. Levodopa

UNIT-IV

Pharmacodynamic Drugs: **8h**

1. Antiasthma Drugs (Salbutamol) 3. Antianginals (Glycerol Trinitrate)

4. Diuretics (Furosemide)

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UNIT-V

9h

HIV-AIDS:

Immunity -CD-4cells, CD-8cells, Retro virus, Replication in human body, Investigation available, prevention of AIDS, Drugs available -examples with structures: PIS: Indinavir (crivivan), Nelfinavir (Viracept).

List of Reference Books:

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

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Cluster Elective –III
ORGANIC
PAPER – VIII-A 3 : PHARMACEUTICAL AND MEDICINAL CHEMISTRY
BLUE PRINT

WEIGHTAGE OF MARKS

S. No	NAME OF THE TOPIC/UNIT	ESSAY QUESTIONS	SHORT ANSWER QUESTIONS
1	UNIT-I	2	2
2	UNIT-II Drugs	2	2
3	UNIT-III Synthesis and therapeutic activity of the compounds	2	2
4	UNIT-IV Pharmacodynamic Drugs	2	2
5	UNIT-V HIV-AIDS	2	2

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Cluster Elective –III
ORGANIC
PAPER – VIII-A 3 : PHARMACEUTICAL AND MEDICINAL CHEMISTRY
MODEL QUESTION PAPER

TIME: 3 HOURS

MAX MARKS: 60

SECTION –A (SHORT ANSWER QUESTIONS)

Answer Any Five of the following.

5 X 4 = 20 Marks

1. Explain Pharmacophore with an example.
2. What is Metabolites and Anti metabolites?
3. What are a Generic name and a Trade name. Give three examples?
4. Write about administration of Drugs.
5. Write the structure and therapeutic use of Sulphamethoxazole.
6. Explain structure and therapeutic activity of Paracetamol.
7. Write the structure and therapeutic activity of Solbutamol.
8. Write about anti anginals.
9. Describe various preventive methods to control AIDS and HIV infections.
10. What are Hypnotic drugs? Give an example?

SECTION –B (ESSAY QUESTIONS)

Answer Any Five of the following.

5 X 8 = 40 Marks

UNIT-I

11. Explain in detail Pharmacokinetics of the drug.

OR

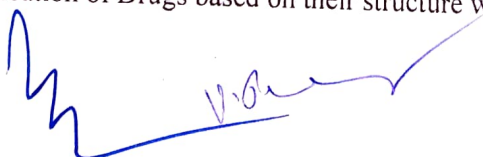
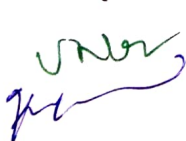
12. Explain the terms a) Pharmacology b) Pharmacodynamics

UNIT-II

13. Explain classification of Drugs based on therapeutic activity with examples.

OR

14. Explain classification of Drugs based on their structure with examples.



UNIT-III

15. Explain structure and therapeutic activity of Paracetamol.

OR

16. Write the structure and therapeutic activity of Salbutamol.

UNIT-IV

17. What are Diuretics? Explain the structure and therapeutic activity of Furosemide.

(OR)

18. What are Antianginals? Explain the structure and therapeutic activity of Glyceryl trinitrate.

UNIT-V

19. What is Retrovirus? How HIV virus replicates in human body? What are Anti retroviral drugs?

OR

20. Give the structure and activity of Crixivan (Indinavir).

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Cluster Elective – II
ANALYTICAL AND PHYSICAL
PAPER – VIII-B-1: POLYMER CHEMISTRY
45 hrs (3 h / w)

12h

UNIT-I

INTRODUCTION OF POLYMERS:

Basic definitions, Degree of Polymerization, Classification of polymers- Natural and Synthetic polymers, Organic and Inorganic polymers, Thermoplastic and Thermosetting polymers, Plastics, Elastomers, Fibers and Resins, Linear, Branched and Cross Linked polymers, Addition polymers and Condensation Polymers, mechanism of polymerization. Free radical, ionic and Zeigler – Natta polymerization.

10h

UNIT-II

TECHNIQUES OF POLYMERIZATION :

Bulk polymerization, Solution polymerization, Suspension and Emulsion polymerization.

Molecular weights of polymers: Number average and Weight average molecular weights.

Determination of molecular weight of polymers by Viscometry, Osmometry and light scattering methods.

6h

UNIT-III

Kinetics of Free radical polymerization, Glass Transition temperature(T_g) and Determination of T_g . Free volume theory, WLF equation, factors affecting glass transition temperature (T_g).

UNIT-IV

POLYMER ADDITIVES

Introduction to plastic additives – Fillers, Plasticizers and Softeners, Lubricants and Flow Promoters, Anti aging additives, Flame Retardants, Colourants, Blowing agents, Cross linking agents, Photo stabilizers, Nucleating agents.

9h

UNIT-V

POLYMERS AND THEIR APPLICATIONS

Preparation and Industrial applications of Polyethylene, Polyvinyl chloride, Teflon, Polyacrylonitrile, Terelene, Nylon6,6.

8h

Reference Books:

1. Seymour, R.B. & Carraher, C.E. *Polymer Chemistry: An Introduction*, Marcel Dekker, Inc. New York, 1981.
2. Odian, G. *Principles of Polymerization*, 4th Ed. Wiley, 2004.
3. Billmeyer, F.W. *Textbook of Polymer Science*, 2nd Ed. Wiley Interscience, 1971.
4. Ghosh, P. *Polymer Science & Technology*, Tata McGraw-Hill Education, 1991.
5. Lenz, R.W. *Organic Chemistry of Synthetic High Polymers*. Interscience Publishers, New York, 1967.

I. LABORATORY COURSE – VIII

Practical Paper – VIII-B-1: (At The End of Semester VI) 30 hrs (2 h / W)

1. Preparation of Aspirin.
2. Preparation of Paracetamol.
3. Preparation of Acetanilide.
4. Preparation of Barbituric Acid.
5. Preparation of Phenyl Azo β -naphthol.

II. LABORATORY COURSE – VIII

Practical Paper – VIII-B-2 (At The End of Semester VI) 30 hrs (2 h / W)

1. Green procedure for organic qualitative analysis: Detection of N, S and halogens
2. Acetylation of 10 amine by green method: Preparation of acetanilide
3. Rearrangement reaction in green conditions: Benzil-Benzilic acid rearrangement
4. Electrophilic aromatic substitution reaction: Nitration of phenol
5. Radical coupling reaction: Preparation of 1,1-bis -2-naphthol
6. Green oxidation reaction: Synthesis of adipic acid
7. Green procedure for Diels Alder reaction between furan and maleic anhydride.

III. Practical:- Project Work

List of Reference Books

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

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Cluster Elective –II

ANALYTICAL AND PHYSICAL

PAPER – VIII-B-1: POLYMER CHEMISTRY

BLUE PRINT

WEIGHTAGE OF MARKS

S. No	NAME OF THE TOPIC/UNIT	ESSAY QUESTIONS	SHORT ANSWER QUESTIONS
1	UNIT-I Introduction of Polymers	2	2
2	UNIT-II Techniques of Polymerization	2	2
3	UNIT-III	2	2
4	UNIT-IV Polymer Additives	2	2
5	UNIT-V Polymers And Their Applications	2	2

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SRR&CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA

B.Sc CHEMISTRY (CLUSTER ELECTIVE –II) VI SEMESTER

**ANALYTICAL AND PHYSICAL PAPER – VIII-B 1
POLYMER CHEMISTRY**

TIME: 3 HOURS

MAX MARKS: 60

SECTION –A (SHORT ANSWER QUESTIONS)

Answer Any Five of the following.

5 X 4 = 20 Marks

1. Explain Thermoplastic and Thermosetting polymers with examples.
2. Explain Zeigler- Natta Polymerisation with example.
3. Define Number average and Weight average molecular weights of Polymers.
4. Write a short note on Emulsion Polymerisation.
5. Explain the factors affecting Tg.
6. Explain Free Volume theory of Polymers.
7. Explain Lubricants and Flow Promoters with examples
8. Explain Anti aging additives and Cross linking agents with examples.
9. Explain the preparation of Polyethylene and give any 2 applications.
10. Explain the preparation of Terelene and give any 2 applications.

SECTION –B (ESSAY QUESTIONS)

Answer Any Five of the following.

5 X 8 = 40 Marks

UNIT-I

11. Explain the mechanism of free radical polymerization.

OR

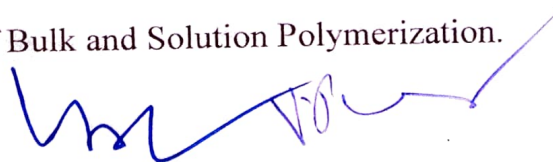

12. Give an account of classification of Polymers with examples.

UNIT-II

13. Explain the method of determining the molecular weight of a polymer by Osmometry.

OR

14. Give an account of Bulk and Solution Polymerization.



UNIT-III

15. Discuss the kinetics of Free radical polymerization.

OR

16. Derive WLF equation.

UNIT-IV

17. Discuss the use of Fillers and Plasticizers as additives in Polymers.

OR

18. Explain Flame Retardants, Colourants, Photo Stabilizers and Nucleating agents with examples.

UNIT-V

19. Explain preparation and industrial applications of Teflon and Nylon6, 6.

OR

20. Explain preparation and industrial applications of PVC and PAN.

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PAPER – VIII-B-2
INSTRUMENTAL METHODS OF ANALYSIS

45 hrs (3 h / w)

UNIT – I

4h

Introduction to spectroscopic methods of analysis:
Recap of the spectroscopic methods covered in detail in the core chemistry syllabus:
Treatment of analytical data, including error analysis. Classification of analytical methods and the types of instrumental methods. Consideration of electromagnetic radiation.

UNIT – II

8h

Molecular spectroscopy:

Infrared spectroscopy:

Interactions with molecules: absorption and scattering. Means of excitation (light sources), separation of spectrum (wavelength dispersion, time resolution), detection of the signal (heat, differential detection), interpretation of spectrum (qualitative, mixtures, resolution), advantages of Fourier Transform (FTIR). Samples and results expected. Applications: Issues of quality assurance and quality control, Special problems for portable instrumentation and rapid detection.

UNIT – III

10h

UV-Visible/ Near IR – emission, absorption, fluorescence and photoacoustic. Excitation sources (lasers, time resolution), wavelength dispersion (gratings, prisms, interference filters, laser, placement of sample relative to dispersion, resolution), Detection of signal (photocells, photomultipliers, diode arrays, sensitivity and S/N), Single and Double Beam instruments, Interpretation (quantification, mixtures, absorption vs. fluorescence and the use of time, photoacoustic, fluorescent tags).

UNIT – IV

8h

Separation techniques

Chromatography: Gas chromatography, liquid chromatography, supercritical fluids, Importance of column technology (packing, capillaries), Separation based on increasing number of factors (volatility, solubility, interactions with stationary phase, size, electrical field), Detection: simple vs. specific (gas and liquid), Detection as a means of further analysis (use of tags and coupling to IR and MS), Electrophoresis (plates and capillary) and use with DNA analysis. 46 Immunoassays and DNA techniques

8h

Mass spectroscopy: Making the gaseous molecule into an ion (electron impact, chemical ionization), Making liquids and solids into ions (electrospray, electrical discharge, laser desorption, fast atom bombardment), Separation of ions on basis of mass to charge ratio, Magnetic, Time of flight, Electric quadrupole. Resolution, time and multiple separations, Detection and interpretation (how this is linked to excitation).

UNIT – V

10h

Elemental analysis:

Mass spectrometry (electrical discharges).

Atomic spectroscopy: Atomic absorption, Atomic emission, and Atomic fluorescence.

Excitation and getting sample into gas phase (flames, electrical discharges, plasmas), Wavelength separation and resolution (dependence on technique), Detection of radiation (simultaneous/scanning, signal noise), Interpretation (errors due to molecular and ionic

species, matrix effects, other interferences).

NMR spectroscopy: Principle, Instrumentation, Factors affecting chemical shift, Spin coupling, Applications. 4h

Electroanalytical Methods: Potentiometry & Voltammetry 4h

Radiochemical Methods 4h

X-ray analysis and electron spectroscopy (surface analysis)

Reference books:

1. Skoog, D.A. Holler F.J. & Nieman, T.A. Principles of Instrumental Analysis, Cengage Learning India Ed.
2. Willard, H.H., Merritt, L.L., Dean, J. & Settoe, F.A. Instrumental Methods of Analysis, 7th Ed. Wadsworth Publishing Company Ltd., Belmont, California, USA, 1988.
3. P.W. Atkins: Physical Chemistry.
4. G.W. Castellan: Physical Chemistry.
5. C.N. Banwell: Fundamentals of Molecular Spectroscopy.
6. Brian Smith: Infrared Spectral Interpretations: A Systematic Approach.
7. W.J. Moore: Physical Chemistry

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SRR & CVR GOVT. DEGREE COLLEGE (A) :: VIJAYAWADA
PAPER – VIII-B-2
INSTRUMENTAL METHODS OF ANALYSIS
Weightage of marks (Blue Print)

S.No	Name of the Topic	Essay Questions	Short Questions
1	Unit- 1 Introduction to spectroscopic methods of analysis	2	2
2	Unit- 2 Molecular spectroscopy Infrared spectroscopy	2	2
3	Unit- 3 UV-Visible/ Near IR	2	2
4	Unit- 4 Separation techniques	2	2
5	Unit- 5 Mass spectrometry	2	2
Total		10	10

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Cluster Elective –II

PAPER – VIII-B-3: ANALYSIS OF DRUGS, FOODS, DAIRY PRODUCTS & BIO-CHEMICAL ANALYSIS

45 hrs (3 h / w)

UNIT- I

Analysis of the following drugs and pharmaceuticals preparations:

(Knowledge of molecular formula, structure and analysis)

Analysis of analgesics and antipyretics like aspirin and paracetamol

Analysis of antimalarials like chloroquine .

Analysis of drugs in the treatment of infections and infestations :Amoxycillin., chloramphenicol, metronidazole, penicillin, tetracycline, cephalexin(cefalexin).

Anti tuberculous drug- isoniazid.

UNIT - II

Analysis of the following drugs and pharmaceuticals preparations:

(Knowledge of molecular formula, structure and analysis)

Analysis of antihistamine drugs and sedatives like: allegra, zyrtec(citirizine),

alprazolam, trazodone, lorazepam, ambien(zolpidem), diazepam.

UNIT - III

Analysis of anti epileptic and anti convulsant drugs like phenobarbital and phenacemide.

Analysis of drugs used in case of cardiovascular drugs: Atenolol, Norvasc(amlodipine),

Analysis of lipitor(atorvastatin) a drug for the prevention of production of cholesterol.

Analysis of diuretics like: furosemide (Lasix), triamterene

Analysis of prevacid(lansoprazole) a drug used for the prevention of production of acids in stomach.

UNIT - IV

Analysis of Milk and milk products: Acidity, total solids, fat, total nitrogen, proteins, lactose, phosphate activity, casein, choride.

Analysis of food materials-

Preservatives: Sodium carbonate, sodium benzoate ,sorbic acid

Coloring materials, -

Brilliant blue FCF, fast green FCF, tertrazine, erythrosine , sunset yellow FCF.

Flavoring agents - Vanilla , diacetyl, isoamyl acetate, limonene, ethylpropionate , allyl hexanoate and Adulterants in rice and wheat, wheat flour, sago, coconut oil, coffee powder, tea powder, milk.

UNIT - V

Clinical analysis of blood:Composition of blood, clinical analysis, trace elements in the body. Estimation of blood chlolesterol, glucose, enzymes, RBC & WBC ,Blood gas analyser.

U. N. S.

[Signature]

REFERENCE BOOKS :

1. F.J. Welcher-Standard methods of analysis,
2. A.I. Vogel-A text book of quantitative Inorganic analysis-ELBS,
- 3 .F.D.Snell & F.M.Biffen-Commercial methods of analysis-D.B.Taraporavala & sons,
4. J.J.Elving and I.M.Kolthoff- Chemical analysis - A series of monographs on analytical chemistry and its applications -- Inter Science- Vol I to VII.,
5. Aanalytical Agricultrual Chemistry by S.L.Chopra & J.S.Kanwar -- Kalyani Publishers
6. Quantitative analysis of drugs in pharmaceutical formulations by P.D.Sethi, CBS Publishers and Distributors, New Delhi
7. G. Ingram- Methods of organic elemental micro analysis- Chapman and Hall.,
8. H. Wincciam and Bobbles (Henry J)- Instrumental methods of analysis of food Additives.
9. H.Edward-The Chemical analysis of foods; Practical treatise on the examination of food stuffs and the detection of adulterants,
10. The quantitative analysis of drugs- D.C.Garratt-Chapman & Hall.,
11. A text book of pharmaceutical analysis by K.A.Connors-Wiley-International.,
12. Comprehensive medicinal chemistry-Ed Corwin Hansch Vol 5,Pergamon Press.

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by VBS

Cluster Elective –II
ORGANIC
PAPER – VIII-B-3: ANALYSIS OF DRUGS, FOODS, DAIRY
PRODUCTS & BIO-CHEMICAL ANALYSIS

BLUE PRINT

WEIGHTAGE OF MARKS

S. No	NAME OF THE TOPIC/UNIT	ESSAY QUESTIONS	SHORT ANSWER QUESTIONS
1	UNIT-I	2	2
2	UNIT-II	2	2
3	UNIT-III	2	2
4	UNIT-IV	2	2
5	UNIT-V	2	2

Unit-I
gpr

Unit-II
Unit-III
Unit-IV
Unit-V