

SIR C R REDDY COLLEGE

Affiliated to Adikavi Nannaya University, Rajamahendravaram



2017-2018

19-07-2017

MINUTES OF BOARD OF STUDIES MEETING

DEPARTMENT OF CHEMISTRY

SIR C R REDDY COLLEGE ELURU -AP- 534007



SIR C R REDDY COLLEGE ELURU, W.G.DT

Affiliated to AdikaviNannaya University, Rajamahendravaram

DEPARTMENT OF CHEMISTRY BOARD OF STUDIES MEETING - 2017-2018

Meeting of **Board of Studies in Chemistry** was held on 19-07-2017 at 10AM in the Department of Chemistry.

Members present

1	Mr G Rambabu ,HOD, Chemistry	Chairman
2	Prof. B.Jagan Mohan Reddy, Dept. Of Chemistry, AdikaviNannayya University, Rajamahendravaram.	University Nominee
3	Dr C A Jyothirmayee, .SG.Lecturer,Dept. Of Chemistry, Ch S D St Theresa's College for Women, Eluru.	Subject Expert
4	Smt B TulasiKoteswari,Sir C R R Degree college for Women ,Eluru	Subject Expert
5	Sri S V Nagaraju. KusumaHaranatha Agro Chemicals,Vijayarai	Industrialist
6	Dr G R Satyanarayana,Dept of Chemistry,Sir C R R college for PG courses,Eluru	Aluminee
7	Sri N V Chowdary,SG.Lecturer in Chemistry	Member
8	Sri S Somasundaram, SG Lecturer in Chemistry	Member
9	Dr K A Ramaraju, SG Lecturer in Chemistry	Member
10	Dr K Srikanth, SG Lecturer in Chemistry	Member
11	Dr K A Emmanuel, SG Lecturer in Chemistry	Member
11	Dr K Ramesh Raju ,SG Lecturer in Chemistry	Member
12	Sri D K R S PrakasaRao, Lecturer in Chemistry	Member
13	Sri V A N Satish, Lecturer in Chemistry	Member
14	Sri K Johar, Lecturer in Chemistry	Member
15	Sri D S Pavan Kumar, Lecturer in Chemistry	Member
16	Sri B BhargavSai	Student
17	G Divikumar	Student

Agenda :

1. To prepare syllabus and model question papers.
2. To have additional curriculum for the all the papers.
3. To suggest methodologies for innovative methods of teaching.
4. To suggest panel of names to Academic Council for appointment of examiners and paper setters.
5. To discuss about coordinating research, teaching, extension and other academic activities in the department.
6. To prepare syllabi for value added certificate course / add – on programmes.
7. To discuss the topic for the students study projects and introduce the study projects for final year advanced learner.
8. To discuss about the introduction of new courses/ Restructured courses.
9. Any other with the permission of the chair.

Purpose of Revision :

1. The courses were updated to focus more on developing the employability skills of the students by keeping them begin preparations for competitive exams especially.
2. To help students obtain a basic understanding of Applicationsof Chemistry

Discussions :

1. Smt. C.A. Jyothirmai subject expert suggested that every faculty should attend atleast one FDP in one semester such that the faculty will acquaint with new topics
2. University subject expert Dr.B. Jaganmohanreddy suggested to create a 'chemistry club'. From which all the activities will conduct and keep it in blogs
3. Smt. C.A. Jyothirmai subject expert suggested that the department members to approach the old students who are well settled in various fields should start a medal or cash award to those student who excelled in the chemistry subject
4. University subject expert Dr.B. Jaganmohanreddy suggested to the department prepare budget proposal to organize various programmes including field trips for the students
5. Smt. B. TulasiKoteswari subject expert suggested that each faculty should apply one research project per academic year to different funding agency like DST, UGC etc
6. University subject expert Dr.B. Jaganmohanreddy suggested to every faculty should involve in the research activity

The newly designed B.Sc Syllabus with complete textual revisions were presented in the Board for review and suggestions.

Resolutions:

1. Resolved to follow the same syllabus and same question paper pattern (both theory & practicals) for I, II, III and IV semesters, as was followed in the previous academic year i.e., 2016-17.
2. Resolved to follow CBCS syllabus for V and VI semesters with a few deviations.
3. The offered elective papers for VI semester Paper VIIA

-Analytical Method in Chemistry, Paper VII B - Environmental Chemistry, Paper VIIC, Green Chemistry

4. Resolved to prepare three type model question paper for all six semesters.
5. Resolved to introduce volumetric experiment between Na_2CO_3 v/s HCl in III semester practicals.
6. Resolved to introduce volumetric experiments in IV semester in addition to the curriculum.
7. Resolved to strengthen continuous assessment of 25 marks in place of 2nd internal of each semester.
8. Resolved to start anew course in B.Sc with Zoology, Fisheries and Chemistry combination from next year i.e 2018-19 academic year onwards.
9. Resolved to make necessary deviations to the syllabus upto a maximum of 20%.
10. Resolved to follow ICT teaching methodology.
11. Resolved to conduct value added and certificate courses.
12. Resolved to guide the III B.Sc students to prepare study projects.
13. Resolved to organize one field trip and two guest extension lectures.
14. Resolved to encourage the students to participate in co-curricular activities like NCC, NSS, cultural activities and extension activities like Swatch Bharat, Tree Plantation, Water conservation etc.,
15. Resolved to suggest the names of paper setters and examiners.
16. Resolved to conduct class room seminars, Quiz programs, Assignments etc., as part of NAAC work.
17. Resolved to start additional sections each in B.Sc M.P.C and M.C.Cs courses from the academic year 2018-19
18. Departmental activities for 2017-18 academic year.

Structure of Chemistry Syllabus Under CBCS

	V	V	Inorganic, Organic and Physical Chemistry	100	03
			Practical- V	50	02
		VI	Inorganic, Organic and Physical Chemistry	100	03
			Practical- VI	50	02
	* Anyone Paper from VIIA, B and C	VII (A)*	Elective: Analytical Method in Chemistry	100	03
			Practical - VIIA	50	02
		VII (B)*	Elective: Environmental Chemistry	100	03
			Practical - VIIB	50	02
		VII	Elective: Green Chemistry	100	03

III		(C)*			
			Practical -VIIC	50	02
	**	VIII (A)**	ClusterElectives -I : VIII-A-1:PolymerChemistry	100	03
	Any onecluste r		VIII-A-2: InstrumentalMethodsofAnalysis	100	03
	from		VIII-A-3:AnalysisofDrugs,Foods,Diary Products&BiochemicalAnalysis	100	03
	VIII,A,B and C			50	02
			PracticalVIIIA-I	50	02
			PracticalVIIIA-2	50	02
			PracticalVIIIA-3		
		VIII (B)**	ClusterElectives -II :: VIII-B-1:FUELCHEMISTRYA NDBATTERIES	100	03
	VI	VIII (C)**	VIII- B-2 :Inorganic Materials if IndustrialImportance	100	03
			VIII-B-3 :Analysis of Industrial ProductsPracticalVIIIB-I	100	03
			PracticalVIIIB-2	50	02
			PracticalVIIIB-3	50	02
			ClusterElectives -III:: VIII-C-1:OrganicSpectroscopic Techniques	100	03
			VIII-C-2:AdvancedOrganicReactions	100	03
			VIII-C-3:PharmaceuticalandMedicainal ChemistryPracti	100	03
			calVIIIC-I	50	02
			PracticalVIIIC-2	50	02
			PracticalVIIIC-3	50	02

The following were the revisions:

SEMESTER – V

PAPER – V

Alkaloids – Definition, classification, Structural elucidation of conine.

PAPER – VI

Introduction : Drug, disease

Generic and trade names: Aspirin, Paracetamol and Omeprazole.

Classification of drugs on the basis of therapeutic activity.

HIV-AIDS: Prevention of AIDS, Drugs available, Ex: Lamovudine, Zidovudine.

SEMESTER – VI

ELECTIVE PAPER – VII:

Solid waste management :Biodegradable and Non Biodegradable waste – Types of solid waste disposable – Landfill composition – Incineration – Recycling – Pyrolysis – Reduction in use.

Disaster Management: Floods – Drought – Earthquakes – Cyclones.

CLUSTER PAPER VIII-1:

Coal tar distillation with excess matter.

CLUSTER PAPER VIII-2:

Polymers: Definition, Classification of polymers. Molecular weight of polymers – number average and weight average molecular weights. Determination of molecular weight of polymers by Osmometry.

Polymers and their application – preparation and industrial applications of polyethylene, poly vinyl chloride, Teflon, Poly acrylo nitrile, terelene and nylon – 6, 6.

Disaster Management: Floods – Drought – Earthquakes – Cyclones.

CLUSTER PAPER VIII-1:

Coal tar distillation with excess matter.

CLUSTER PAPER VIII-2:

Polymers: Definition, Classification of polymers. Molecular weight of polymers – number average and weight average molecular weights. Determination of molecular weight of polymers by Osmometry.

Polymers and their application – preparation and industrial applications of poly

ethylene, poly vinyl chloride, Teflon, Poly acrylo nitrile, terelene and nylon – 6, 6.

CLUSTER PAPER VIII-3:

SOLVENT EXTRACTION: Introduction, Principle, distribution law, factors affecting solvent extraction, types of solvent extraction techniques – Batch extraction, Continuous extraction and counter current extraction. Application – Determination of Iron (III)

CHROMATOGRAPHY: Classification of chromatographic methods, Principles of differential migration adsorption phenomenon, R_f values, factor affecting R_f values.

PAPER CHROMATOGRAPHY: Principles, R_f values, experimental procedures, choice of paper and solvent systems, development of chromatogram – ascending, descending and radial. Two dimensional chromatography, applications.

THIN LAYER CHROMATOGRAPHY: Advantages, principles, factor affecting R_f values. Experimental procedure, Adsorbents and solvents. Preparation of plates, development of chromatogram, detection of spots. Applications.

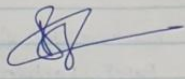
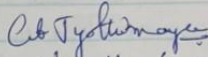
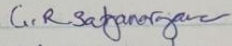
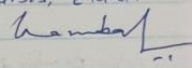
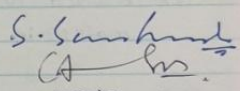
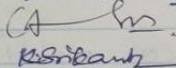
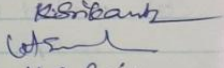
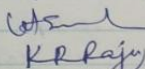
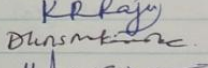
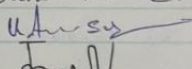
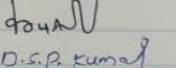
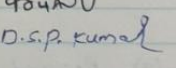
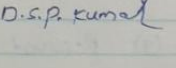
COLUMN CHROMATOGRAPHY: Principles, experimental procedures, stationary and mobile phases, separation technique. Applications.

HPLC: Basic principles and applications.

Signature of the experts and members:

Dept of Chemistry - Board of Studies meeting 19-7-17

Members present:-

- (1) Dr. B. Jagan Mohan Reddy,
Department of Chemistry,
AKNU, Rajahmundry.
University Nominee

9347153270
- (2) Smt. C A Jyothirmayi, subject expert
SG lecturer, Dept. of chemistry, ch. S.D. st. Theresa's college for women,
Eluru. 
- (3) Smt. B Tulasi Koteswari, subject expert
Sr CRR Degree college for women, Eluru
B. Tulasi
- (4) Sri S V Naga Raju, Industrialist
Kusuma Haganadha Agro chemicals, vijaya gani
- (5) Dr. G R Satyanarayana, Alumni
Dept. of chemistry, Sr CRR college for PG courses, Eluru.

- (6) Sri G Rambabu, HOD, Dept of chemistry

- (7) Sri N V choudary
- (8) Sri S. Somasundaram

- (9) Dr. K A Rama Raju

- (10) Dr. K Srikanth

- (11) Dr. K A Emmanuel

- (12) Dr. K Ramesh Raju

- (13) Sri. DKRS Prakash Rao

- (14) Sri. VAN Sathish

- (15) Sri. K Joha

- (16) Sri. D. Seshu Pavan Kumar


Meritorious students :

B. Bhargav Sai

Syllabus Deviation



Employability



Entrepreneurship



Skill Development



w.e.f.:2015-16admittedBatch



SIR C R REDDY COLLEGE, ELURU
 (Affiliated to Adikavi Nannaya University) I
 Year B.Sc. - I Semester CBCS
Syllabus Subject: CHEMISTRY
 Paper I : Inorganic & organic chemistry

COURSE TITLE	MAJOR CORE 1 INORGANIC & ORGANIC CHEMISTRY
TOTAL HOURS	60 Hrs
HOURS/WEEK	4 T+2P
COURSE CODE	CHE-1A
COURSE TYPE	THEORY
CREDITS	3T+2P
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

OBJECTIVES :

To make the students understand and learn about the periodic table and variation in periodic properties, organic metallic compounds, benzene and its reactivity

INORGANIC CHEMISTRY-I**UNIT-I****1. p-block elements:****23h**

Group-13: Synthesis and structure of **diborane** and higher boranes (B_4H_{10} and B_5H_9), **boron-nitrogen compounds** ($B_3N_3H_6$ and BN)

Group- 14: Preparation, structure and application of silanes and silicones,

Group- 15: Preparation of Hydrazine by Raschig's method and from nitric oxide.
 Reactions of hydrazine: With ozone, with halogens, with Nitrous acid, with Au and Cu salts, and with $KMnO_4$

Preparation of Hydroxylamine from nitric oxide and by electrolytic method.
 Reactions of Hydroxylamine:
 Autoxidation, with halogens, with oxygen, With Bromate and with $FeSO_4$

Group– 16:

Classificationsofoxidesbasedon(i)Chemicalbehaviourand(ii)Oxygencontent.

Group– 17: Inter halogen compounds – Preparation and structures of AX, AX₃, AX₅,andAX₇typesand Pseudo halogens.

UNIT-II

2. Organo metallic cChemistry

7 h

Definition and classification of organometallic compounds, nomenclature, preparation-Fromalkyl halides,properties and applications of alkyls of Li, Mg elements - Preparation of Hydrocarbons, preparation of Alcohols(1° 2°& 3°),preparation of CarbonylCompoundsandAdditionof Carbon dioxide.

ORGANICCHEMISTRY-I

UNIT-III

1. Structural theory in Organic Chemistry

10 h

Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radicalreagentsincludingneutral molecules likeH₂O, NH₃&AlCl₃).

Bond polarization : Factors influencing the polarization of covalent bonds, electro negativity–inductiveeffect.Applicationofinductiveeffect(a)Basicityofamines(b)Acidityofcarboxylicacids (c) Stabilityofcarbonium ions. ResonanceorMesomericeffect,

application to(a) acidity of phenol, and(b) acidity of carboxylic acids.Hyperconjugationandits application to stabilityofcarboniumions, Freeradicalsandalkenes.

TypesofOrganicreactions:Addition–electrophilic,nucleophilicandfreeradical.Substitution–electrophilic,nucleophilicandfreeradical.Elimination-Examples(mechanismnot required).

UNIT-IV

2. Acyclic Hydrocarbons:

6 h

Alkenes – Preparation of alkenes (a) by dehydration of alcohols (b) by dehydrohalogenation of alkyl halides (c) by dehalogenation of 1,2 dihalides, Saytzev's rule.

Properties: Addition of hydrogen – heat of hydrogenation and stability of alkenes. Addition of halogen and its mechanism. Addition of HX, Markonikov's rule, addition of H₂O, HOX, H₂SO₄ with mechanism and addition of HBr in the presence of peroxide (anti – Markonikov's addition). Dienes – Types of dienes – 1,2 and 1,4 addition of HBr to 1,3 – butadiene and Diels-Alder reaction.

Alkynes – Preparation by dehydrohalogenation of dihalides, dehalogenation of tetrahalides, Properties; Acidity of acetylenic hydrogen (formation of Metal acetylides). Preparation of higher acetylenes, Metal ammonia reductions Physical properties. Chemical reactivity – electrophilic addition of X₂, HX, H₂O (Tautomerism), Oxidation with KMnO₄, OsO₄, reduction and Polymerisation reaction of acetylene.

3. Alicyclic hydrocarbons (CycloAlkanes)

4 h

Nomenclature, Preparation by Freund's methods, heating dicarboxylic metal salts. Stability of cycloalkanes – Baeyer's strain theory, Sachse and Mohr predictions and Pitzer's strain theory. Conformational structures of cyclobutane, cyclopentane, cyclohexane.

UNIT-V

4. Benzene and its reactivity:

10 h

Concept of resonance, resonance energy. Heat of hydrogenation, heat of combustion of Benzene, mention of C-C bond lengths and orbital picture of Benzene.

Concept of aromaticity – aromaticity (definition), Huckel's rule – application to Benzenoid (Benzene, Naphthalene) and Non-Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation)

Reactions – General mechanism of electrophilic substitution, mechanism of nitration. Friedel-Craft's alkylation and acylation. Orientation of aromatic substitution – Definition of ortho, para and meta directing groups. Ring activating and deactivating groups with examples (Electronic interpretation of various groups like NO₂ and Phenolic). Orientation of (i). Amino, methoxy and methyl groups (ii). Carboxy, nitro, nitrile, carbonyl and Sulfonic acid groups. (iii). Halogens (Explanation by taking minimum of one example from each type).

REFERENCE BOOKS

1. Principles of physical chemistry by Prutton and Marron
2. Solid State Chemistry and its applications by Anthony R. West
3. Text book of physical chemistry by K L Kapoor
4. Text book of physical chemistry by S Glasstone
5. Advanced physical chemistry by Bahl and Tuli
6. Inorganic Chemistry by J. E. Huheey

7. Basic Inorganic Chemistry by Cotton and Wilkinson
8. A textbook of qualitative inorganic analysis by A.I. Vogel
9. Atkins, P.W. & Paula, J. de Atkin's Physical Chemistry Ed., Oxford University Press 10th Ed (2014).
10. Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).
11. Mortimer, R. G. Physical Chemistry 3rd Ed. Elsevier: NOIDA, UP (2009)
12. Barrow, G.M. Physical Chemistry

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupEQEC&printsec=copyright#v=onepage&q&f=false>

CO1: To gain knowledge about preparation, structure and applications of compounds formed by the P block elements.

CO2: To gain knowledge about preparation and reactivity of Grignard reagent and its activities in reactions

CO3: To gain knowledge about basic organic chemistry definitions and types of reactions

CO4: To understand about classification and preparation of acyclic and alicyclic hydrocarbons

CO5: To gain knowledge about preparation, structure, reactivity of benzene and Aromaticity of benzene.

Programme specific outcomes :

PSO-1 : Chemistry of p – block elements

To gain knowledge about the diborane, borazine, silicones, phosphonitrilic halides, oxides and oxyacids of sulphur, pseudo halogens and interhalogen compounds.

PSO-2 : Organometallic Chemistry

To gain knowledge about preparation and reactivity of Grignard reagent and its activities in reactions

PSO-3 : Structural theory in Organic Chemistry

To gain knowledge about basic organic chemistry definitions and types of reactions

PSO-4 Acyclic Hydrocarbons & Alicyclic hydrocarbons (CycloAlkanes)

To gain knowledge about basic organic chemistry definitions and types of reactions

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PSO-5 :Benzene and its reactivity:: To gain knowledge To gain knowledge about preparation , structure, reactivity of benzene and Aromaticity of benzene.

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BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions	No. of Very Short Answer Questions
01	I	1+1	1+1	1+1
02	II	1+1	1+1	1+1
03	III	1+1	1	1
04	IV	1	1+1	1
05	V	1	1	1+1

SIR C R REDDY COLLEGE, ELURU
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I Year B.Sc. (I Semester) Model Paper

Subject: **CHEMISTRY**

PAPER – I INORGAIC & ORGANIC CHEMISTRY

Time:3Hrs

Maximum Marks:75

Pass Minimum: 26

PART – I

Answer any FOUR questions choosing atleast one fromeach section. 4 x 10 = 40M

SECTION -A

- 1.
- 2.
- 3.
- 4.

SECTION – B

- 5.
- 6.
- 7.
- 8.

PART – II

Answer any FIVE ofthefollowing:

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.

5 x 5 =25M

15.

16

PART – III

Answer any FIVE of the following:

5 x 2 =10M

17.

18.

19.

20.

21.

22.

23.

24.

LABORATORY COURSE –I
30 hrs (2h/ w)
Practical-I Simple Salt Analysis
(At the end of semester-I)

Qualitative inorganic analysis

Analysis of simple salt containing one anion and cation from the following

Anions:

carbonate, Sulphate, Chloride, Bromide, Iodide, Acetate, Borate, Nitrate, Phosphate

Cations:

Lead, Copper, Iron, Aluminium, Zinc, Manganese, Nickel, Calcium, Strontium, barium, potassium and ammonium.

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I B.Sc – CHMISTRY – SEMESTER-II

PAPER – II : ORGANIC AND GENERAL CHEMISTRY

60hrs (4 h/w)

COURSE TITLE	MAJOR CORE 1-ORGANIC & GENERAL CHEMISTRY -1
TOTAL HOURS	60 Hrs
HOURS/WEEK	4 T+2P
COURSE CODE	CHE-1B
COURSE TYPE	THEORY
CREDITS	3T+2P
MARKS	60
Programme code	5101UMPCS 5503UBZC 1830UFZC 1728UMCCS

Objectives:

To understand about Alkanes and Cycloalkanes, Alkenes & Alkynes, Benzene and its reactivity, Surface chemistry and chemical bonding, HSAB , Stereochemistry of carbon compounds .



SIRC.R.REDDY COLLEGE,ELURU
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I Year B.Sc. - II Semester *Syllabus*

Subject: **CHEMISTRY**

Paper II : **Physical & General chemistry**

UNIT-I

Solid-state

10h

Symmetry in crystals. Law of constancy of interfacial angles. The law of rationality of indices. The law of symmetry. **Definition** of lattice point, space lattice, unit cell. Bravais lattices and crystal systems. X-ray diffraction and crystal structure. Bragg's law. **Defects in crystals**. Stoichiometric and non-stoichiometric defects.

UNIT-II

1. Gaseous state

6 h

Compression factors, deviation of real gases from ideal behavior. **Vander Waal's** equation of state. P-V Isotherms of real gases, **Andrew's isotherms** of carbon dioxide, continuity of state. Critical phenomena. The Vander Waal's equation and the critical state. **Law of corresponding states**. Relationship between critical constants and Vander Waal's constants. Joule Thomson effect.

2. Liquid state

4 h

Structural **differences** between solids, liquids and gases. Liquid crystals, the mesomorphic state. Classification of liquid crystals into Smectic and Nematic. Differences between liquid crystal and solid/liquid. **Application of liquid crystals as LCD devices.**

UNIT-III

Solutions

10h

Liquid-liquid - ideal solutions, **Raoult's law**. Ideally dilute solutions, Henry's law. Non-ideal solutions. Vapour pressure - composition and vapour pressure- temperature curves. Azeotropes-HCl-H₂O, ethanol-water systems and fractional distillation. Partially miscible liquids **-phenol-water**, trimethylamine-water, nicotine-water systems. Effect of impurity on consolute temperature. Immiscible liquids and steam distillation. **Nernst distribution law**. Calculation of the partition coefficient. Applications of distribution law.

UNIT-IV

I. Surface chemistry**8 h**

Definition of **colloids**. Solids in liquids (sols), preparation, purification, properties - kinetic, optical, electrical. Stability of colloids, Hardy-Schulze law, protective colloid. Liquids in liquids (emulsions) preparation, properties, uses. Liquids in solids (gels) preparation, uses.

Adsorption: Physical **adsorption**, chemisorption. Freundlich, Langmuir adsorption isotherms.

Applications of adsorption

2. Chemical Bonding**7h**

Valence bond theory, hybridization, **VB theory** as applied to ClF_3 , $\text{Ni}(\text{CO})_4$, 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).

UNIT-V

Stereochemistry of carbon compounds**15 h**

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

Optical isomerism: Optical activity- wave nature of light, plane polarised light, optical rotation and 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 and R,S configuration methods and E,Z- configuration with examples.

List of Reference Books

1. Principles of physical chemistry by Prutton and Marron
2. Solid State Chemistry and its applications by Anthony R. West
3. Text book of physical chemistry by K. L. Kapoor
4. Text book of physical chemistry by S. Glasstone
5. Stereochemistry of Organic compounds by E. L. Eliel
6. Advanced Organic Chemistry by F. A. Carey and R. J. Sundberg
7. Stereochemistry by P. S. Kalsi
8. Stereochemistry of Organic compounds by D. Nasipuri
9. Advanced physical chemistry by Bahl and Tuli
10. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan

Web Links:

4. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.html?id=h3SwSOWsHsYC&redir_esc=y
5. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
6. <https://books.google.co.in/books?id=mnsKyupEOEC&printsec=copyright#v=onepage&q&f=false>

CO1: To understand about properties of solids and characters of solids

CO2: To understand about the properties of liquids and gases

CO3: To gain knowledge about Basic definitions and azeotropic mixtures, CST systems

CO4: To gain knowledge about Colloidal solutions, Emulsions and Adsorptions.

CO5: To gain knowledge about formation of bonds and Bonding theories. To gain knowledge about Isomerism of Carbon compounds and stereo Chemistry of carbon compounds.

Programme specific outcomes :

Recapitulation of Basics of Organic chemistry:

PSO-1 :solid state

To understand about properties of solids and characters of solids

PSO-2 :gaseous state & liquid state

To understand about the properties of liquids and gases

PSO-3 :solution

To gain knowledge about Basic definitions and azeotropic mixtures, CST systems

PSO-4 :surface chemistry:

To gain knowledge about Colloidal solutions, Emulsions and Adsorptions.

PSO-5 :Stereochemistry of carbon compounds:

To gain knowledge about formation of bonds and Bonding theories. To gain knowledge about Isomerism of Carbon compounds and stereo Chemistry of carbon compounds

BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions	No. of Very Short Answer Questions
01	I	1+1	1+1	1+1
02	II	1+1	1+1	1+1
03	III	1+1	1	1
04	IV	1	1+1	1
05	V	1	1	1+1

SIR C R REDDY COLLEGE, ELURU
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)
I Year B.Sc. (II Semester) Model Paper
Subject: **CHEMISTRY**
PAPER – II PHYSICAL & GENERAL CHEMISTRY

Time: 3Hrs

Maximum

Marks: 75

Pass Minimum: 26

----- **PART – I**

Answer any FOUR questions choosing atleast one from each section. 4 x 10 =

40M SECTION -A

1.

2.

3.

4.

SECTION – B

5.

6.

7.

8.

PART – II

Answer any FIVE of the following:

9.

5 x 5 = 25M

10.

11.

12.

13.

14.

15.

16

PART – III

Answer any FIVE of the following:

5 x 2 =10M

17.

18.

19.

20.

21.

22.

23.

24.

LABORATORY COURSE –II

30 hrs (2h/ w)

Practical-II Mixture Analysis

(At the end of semester-II)

Qualitative inorganic analysis

Analysis of Mixture salt containing two anions and cations from the following

Anions:

carbonate, Sulphate, Chloride, Bromide, Iodide, Acetate, Borate, Nitrate, Phosphate

Cations:

Lead, Copper, Iron, Aluminium, Zinc, Manganese, Nickel, Calcium, Strontium, barium, potassium and ammonium.

SIR C R REDDY COLLEGE, ELURU

II Year B.Sc. (III Semester) Syllabus

Subject :CHEMISTRY

Paper-III :Inorganic Chemistry &Organic Chemistry

60 hrs (4 h / w)

COURSE TITLE	MAJOR CORE 1-INORGANIC & ORGANIC CHEMISTRY-1
TOTAL HOURS	60 Hrs
HOURS/WEEK	4 T+2P
COURSE CODE	CHE-2A
COURSE TYPE	THEORY
CREDITS	3+2
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

OBJECTIVES :

To make the students understand and learn about the basic concepts of d-block and f-block elements, Theories of bonding in metals, Preparation of alcohols, phenols, named reactions, Preparation and properties of acetoacetic ester and melonic ester

INORGANIC CHEMISTRY - 30 hrs (2h / w)

UNIT – I

1. Chemistry of d-block elements (9 hrs)

Characteristics of d-block elements with special reference to electronic configuration, colour, variable valence, magnetic properties, catalytic properties and ability to form complexes.

Stability of various oxidation states by using red-ox potential diagrams-Latimer and Frost diagrams.

2. Theories of bonding in metals: (6 hrs)

Metallic properties and its limitations, Valence bond theory, Free electron theory,

Explanation of thermal and electrical conductivity of metals, limitations, Band theory, formation of bands, explanation of conductors, semiconductors and insulators.

UNIT – II

1. Metal carbonyls and related compounds: (7 hrs)

EAN rule, classification of metal carbonyls, structures and shapes of metal carbonyls of V, Cr, Mn, Fe, Co and Ni.

2. Chemistry of f-block elements: (8 hrs)

Chemistry of lanthanides - electronic structure, oxidation states, lanthanide contraction, consequences of lanthanide contraction, magnetic properties. Separation of lanthanides by ion exchange method and solvent extraction method. Chemistry of actinides - electronic configuration, oxidation states, actinide contraction, comparison of lanthanides and actinides.

Additional Curriculum : Nitrosyls and Ferrocene

Evaluation of Analytical data, accuracy, precision, data etc...

ORGANIC CHEMISTRY- 30 h (2h/w)

UNIT – III

1. Halogen compounds (5 hrs)

Nomenclature and classification of alkyl (into primary, secondary, tertiary), aryl, aryl alkyl, allyl, vinyl, benzyl halides.

Nucleophilic aliphatic substitution reaction- classification into S_N1 and S_N2 – reaction mechanism with examples – Ethyl chloride, t-butyl chloride and optically active alkyl halide 2-bromobutane.

2. Hydroxy compounds (5 hrs)

Nomenclature and classification of hydroxy compounds.

Alcohols: Preparation with hydroboration reaction, Grignard synthesis of alcohols.

Phenols: Preparation i) from diazonium salt, ii) from aryl sulphonates, iii) from cumene.

Physical properties- Hydrogen bonding (intermolecular and intramolecular). Effect of hydrogen bonding on boiling point and solubility in water.

Identification of alcohols by oxidation with $KMnO_4$, Ceric ammonium nitrate, Lucas reagent and phenols by reaction with $FeCl_3$.

Chemical properties: a) Dehydration of alcohols. b) Oxidation of alcohols by CrO_3 , $KMnO_4$.

c) Special reaction of phenols: Bromination, Kolbe-Schmidt reaction, Reimer-Tiemann reaction, Fries rearrangement, azocoupling, Pinacol-Pinacolone rearrangement.

UNIT-IV

Carbonyl compounds (10 hrs)

Nomenclature of aliphatic and aromatic carbonyl compounds, structure of the carbonyl group. Synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3-dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties: Reactivity of carbonyl group in aldehydes and ketones.

Nucleophilic addition reaction with a) $NaHSO_3$, b) HCN , c) $RMgX$, d) NH_2OH , e) $PhNHNH_2$, f) 2,4-DNPH, g) Alcohols-formation of hemiacetal and acetal.

Base catalysed reactions: a) Aldol, b) Cannizzaro reaction, c) Perkin reaction, d) Benzoin condensation, e) Haloform reaction, f) Knoevenagel reaction.

Oxidation of aldehydes- Baeyer-Villiger oxidation of ketones.

Reduction: Clemmensen reduction, Wolf-Kishner reduction, MPV reduction, reduction with $LiAlH_4$ and $NaBH_4$.

Analysis of aldehydes and ketones with a) 2,4-DNT test, b) Tollen's test, c) Fehling test, d) Schiff's test, e) Haloform test (with equation)

UNIT-V

1. Carboxylic acids and derivatives (6 hrs)

Nomenclature, classification and structure of carboxylic acids.

Methods of preparation by

- Hydrolysis of nitriles, amides
- Hydrolysis of esters by acids and bases with mechanism
- Carbonation of Grignard reagents.

Special methods of preparation of aromatic acids by

- Oxidation of side chain.
- Hydrolysis by benzotrichlorides.
- Kolbe reaction.

Physical properties: Hydrogen bonding, dimeric association, acidity- strength of acids with examples of trimethyl acetic acid and trichloroacetic acid. Relative differences in

the acidities of aromatic and aliphatic acids.

Chemical properties: **Reactions** involving H, OH and COOH groups- salt formation, anhydride formation, acid chloride formation, amide formation and esterification (mechanism). Degradation of carboxylic acids by Huns-Diecker reaction, decarboxylation by Schmidt reaction, Arndt-Eistert synthesis, halogenation by Hell-Volhard- Zelinsky reaction.

2. Active methylene compounds (4 hrs)

Acetoacetic esters: keto-enol tautomerism, **preparation by Claisen condensation**, Acid hydrolysis and ketonic hydrolysis.

Preparation of a) monocarboxylic acids. b) Dicarboxylic acids. c) Reaction with urea

Malonic ester: preparation from acetic acid.

Synthetic applications: Preparation of

a) monocarboxylic acids (propionic acid and n-butyric acid).

b) Dicarboxylic acids (succinic acid and adipic acid)

c) α,β -unsaturated carboxylic acids (crotonic acid). d) Reaction with urea.

List of Reference Books

1. Selected topics in inorganic chemistry by W.D. Malik, G..D. Tuli, R.D. Madan
2. Inorganic Chemistry J E Huheey, E A Keiter and R L Keiter
3. A Text Book of Organic Chemistry by B.S. Bahland Arun Bahl
4. A Text Book of Organic Chemistry by Voll by I.L. Finar Voll
5. Organic chemistry by Bruice
6. Organic chemistry by Clayden
7. Advanced Inorganic chemistry by Gurudeep Raj
8. Basic Inorganic Chemistry by Cotton and Wilkinson
9. Concise Inorganic Chemistry by J.D. Lee

Web Links

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupEQEC&printsec=copyright#v=onepage&q&f=false>

Course outcomes :

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

CO-1 : Understand the basic concepts of d-block and f-block elements.

CO-2 : Understand the Theories of bonding in metals and Structures of Metal Carbonyls.

CO-3 : Understand preparation, properties and reactions of halo alkanes, halo arenes and oxygen containing functional groups.

CO-4 : Use the Synthetic chemistry learnt in this course to do functional transformations.

CO-5 : To propose possible mechanism for any relevant reactions.

Programme specific outcomes :

PSO-1: Chemistry of d-block elements

To gain knowledge about characteristic properties of d-block elements.

PSO-2: Chemistry of f-block elements

To gain knowledge about Lanthanides and Actinides.

PSO-3: Theories of bonding in metals

To gain knowledge about Theories of Metals like Free Electron theory, VBT, MO.

PSO-4: Metal Carbonyls

To gain knowledge about Preparation and structures of some metal carbonyls.

PSO-5: Halogen Compounds

To gain knowledge about SN_1 and SN_2 reactions.

PSO-6: Hydroxy Compounds

To gain knowledge about preparation and properties of alcohols and phenols.

PSO-7: Carbonyl Compounds

To gain knowledge about preparation and properties of aldehydes and ketones.

PSO-8: Carboxylic acids and its derivatives

To gain knowledge about acid derivatives

PSO-9: Active Methylene Compounds

To gain knowledge about synthesis and reactivity of acetoacetic ester and malonic ester.

SIR C R REDDY COLLEGE, ELURU
(affiliated to AdikaviNannaya university, Rajamahendravaram)

II BSC- III Semester: subject: Chemistry
Paper-III: Inorganic and Organic Chemistry

BLUE PRINT

Kindly follow the blue print of the syllabus strictly, while preparing the Question paper

S.NO	Unit	Chapters	No. of Essays	No. of Shorts	No. of Very Shorts
1	I	1.Chemistry of d-block elements	1	1	1
		2.Theories of bonding in metals	1	1	1
2	II	1.Metal carbonyls & related compounds	1	1	1
		2.Chemistry of f-block elements	1	1	1
3	III	1.Halogen compounds	1	1	-
		2.Hydroxy compounds	1	1	1
4	IV	Carbonyl compounds	1	1	2
5	V	1.Carboxylic acid and derivatives	-	1	1
		2.Active methylene compounds	1	-	-

BLUE PRINT FOR SEMESTER END EXTERNAL EXAMINATION FOR ALL SEMESTERS w.e.f 2015-16 ADMITTED BATCH

S.No	Type of Question	Given in the Question paper			To be answered		
		No. of questions	Marks allotted to each question	Total marks	No. of questions	Marks allotted to each question	Total marks
1.	Part - 1 Essay Questions	8	10	80	4	10	40
2.	Part - 2 Short Questions	8	5	40	5	5	25
3.	Part - 3 Very Short Questions	8	2	16	5	2	10
Total				136			75

$$\text{Percentage of Choice given} = \frac{136-75}{136} \times 100 = 44.8\%$$

SIR C R REDDY COLLEGE, ELURU
(Affiliated to AdikaviNannayauniversity, Rajamahendravaram)

IIBSC- CHEMISTRY-SEMESTER-III
PAPER-III: INORGANIC AND ORGANIC CHEMISTRY
MODEL PAPER

Time:3Hrs

Max.marks:75

PART-I

Answer any FOUR questions choosing at least one from each section

4 x 10 = 40

SECTION -A (Inorganic chemistry)

- 1.
- 2.
- 3.
- 4.

SECTION -B (Organic chemistry)

- 5.
- 6.
- 7.
- 8.

PART-II

Answer any FIVE of the following

5 X 5 = 25

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

PART-III

Answer any FIVE of the following

5 x 2 = 10

- 17.
- 18.
- 19.
- 20.
- 21.
- 22.
- 23.
- 24.

LABORATORY COURSE –III
30 hrs (2h/ w)
Practical-III Titrimetric Analysis
(At the end of semester-III)

Titrimetric Analysis:

1. Estimation of the amount of Na_2CO_3 Present in given solution by using HCl as a primary standard solution
2. Determination of Fe(II) using KMnO_4 by using Oxalic acid as a primary standard.
3. Determination of Cu(II) using $\text{Na}_2\text{S}_2\text{O}_3$ with $\text{K}_2\text{Cr}_2\text{O}_7$ as a primary standard

SCHEME OF VALUATION :

Practical : 35

Record : 10

Viva : 05

Total	50M

w.e.f. 2015-16 Admitted batch(CBCS)Pattern

SIR C R REDDY COLLEGE, ELURU

II Year B.Sc. (IV Semester) Syllabus

Subject: CHEMISTRY

Paper-IV:SPECTROSCOPY AND PHYSICAL CHEMISTRY

60 hrs (4 h / w)

COURSE TITLE	MAJOR CORE 1-SPECTROSCOPY&PHYSICAL CHEMISTRY
TOTAL HOURS	60 Hrs
HOURS/WEEK	4 T+2P
COURSE CODE	CHE-2B
COURSE TYPE	THEORY
CREDITS	3+2
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

Objectives:

To understand about UV, IR, NMR- Spectroscopy and phase rule, dilute solutions, electrochemistry

SPECTROSCOPY – 30 hrs (2h/w)

UNIT-I

6 h

General features of **absorption spectroscopy** - Beer-Lambert's law and its limitations, transmittance, Absorbance and molar absorptivity. Single and double beam spectrophotometers. **Application** of Beer-Lambert law for quantitative analysis of

1. Chromium in $K_2Cr_2O_7$
2. Manganese in Manganous sulphate

Electronic spectroscopy:

8h

Interaction of electromagnetic radiation with molecules and **types of molecular spectra**. **Energy levels of molecular orbitals** (σ , π , n). **Selection rules for electronic spectra**. **Types of electronic transitions in molecule effect of conjugation**. **Concept of chromophore and auxochrome**.

UNIT-II

Infra red spectroscopy

8h

Different Regions in Infrared radiations. **Modes of vibrations** in diatomic and polyatomic molecules. Characteristic absorption bands of various functional groups. Interpretation of spectra-Alkanes, Aromatic, Alcohols carbonyls, and amines with one example to each.

Proton magnetic resonance spectroscopy (1H-NMR)

8h

Principles of nuclear **magnetic resonance**, equivalent and non-equivalent protons, **position of**

signals. Chemical shift – factors affecting chemical shift - NMR splitting of signals - spin-spin coupling, coupling constants. Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde and acetophenone.

PHYSICAL CHEMISTRY 30 hrs (2h / w)

UNIT-III

Dilute solutions

10h

Colligative properties. Raoult's law, relative lowering of vapour pressure, its relation to molecular weight of non-volatile solute. Elevation of boiling point and depression of freezing point. Derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods of determination – (a) Lowering of vapour pressure by Ostwald and Walker's method (b) Elevation of boiling method by Landsberg's method (c) Depression in freezing point by Beckmann's method. Osmosis, osmotic pressure, experimental determination by Berkeley and Hartley's method. Theory of dilute solutions. Determination of molecular weight of non-volatile solute from osmotic pressure. Abnormal Colligative properties- Van't Hoff factor

UNIT-IV

1. Electrochemistry-I

10h

Specific conductance, equivalent conductance. Variation of equivalent conductance with dilution. Migration of ions, Kohlrausch's law. Arrhenius theory of electrolyte dissociation and its limitations. Ostwald's dilution law. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Definition of transport number, determination by Hittorff's method. Application of conductivity measurements- conductometric titrations.

2. Electrochemistry-II

4h

Single electrode potential, sign convention, Reversible and irreversible cells, Nernst Equation- Reference electrode, Standard Hydrogen electrode, calomel electrode. Calculation of EMF of cell from SRP values.

UNIT-V

Phase rule

6h

Concept of phase, components, degrees of freedom. Phase equilibrium of one component - water system. Phase equilibrium of two- component system, solid-liquid equilibrium. Simple eutectic diagram simple eutectic diagram of NaCl-Water system of Pb-Ag system, Freezing mixtures.

Additional Syllabus:

Electrochemistry: Potentiometric Titrations.

Phase rule : Desilverisation of Lead, Mg-Zn System.

List of Reference Books

1. Spectroscopy by William Kemp
2. Spectroscopy by Pavia
3. Organic Spectroscopy by J. R. Dyer
4. Modern Electrochemistry by J.O. M. Bockris and A.K.N. Reddy
5. Advanced Physical Chemistry by Atkins
6. Introduction to Electrochemistry by S. Glasstone
7. Elementary organic spectroscopy by Y.R. Sharma
8. Spectroscopy by P.S. Kalsi

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepQEC&printsec=copyright#v=onepage&q&f=false>

Course outcomes :

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

CO-1 : Understand the basic concepts of Absorption spectroscopy, electronic spectroscopy, IR Spectroscopy, H-NMR spectroscopy.

CO-2 : Understand the basic concepts of Dilute solutions and Electro chemistry

Programme specific outcomes :

PSO-1 :General features of absorption spectroscopy:

To gain knowledge about Beers Lamberts Law ,Transmittance, Absorbance, single and Double Beam spectrophotometer and applications of beers lamberts law

PSO-2 :Electronic Spectroscopy:

To gain knowledge about energy levels of molecular orbitals and types of electronic transitions and concepts of chromophores and auxochromes

PSO-3 : IR Spectroscopy

To gain knowledge about Modes of vibrations in di atomic and poly atomic molecules and characteristics of absorption bands of different functional groups.

PSO-4 : Proton Magnetic resonance spectroscopy:

To gain knowledge about Principles of NMR, chemical shift, Spin-spin coupling and Applications of NMR.

PSO-5 : Dilute solutions :

Colligative Properties, Raoult's Law, Experimental determination methods of RLVP, elevation of boiling point ,depression in freezing point. Osmotic pressure

PSO-6 : Electrochemistry-I

To gain knowledge about Kohlrausch Law, Arrhenius theory, Ostwald's dilution law,

Debye-Huckel-on sagars equation, Definition of Transport number and Determination of Hittorfs method.

PSO-7 : Electrochemistry-II

To gain knowledge about , Nernst equation, SHE, Calomel electrode, Applications of EMF Measurements

PSO-8 : Phase rule:

To gain knowledge about one component system, two component system, freezing mixtures

SIR C R REDDY COLLEGE, ELURU
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)

II B.Sc – CHMISTRY – SEMESTER-IV

PAPER – IV : SPECTROSCOPY & PHYSICAL CHEMISTRY

BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNI T	No. of Essay Questions	No. of Short Answer Questions	No. of Very Short Answer Questions
01	I	1+ 1	1+ 1	1+ 1
02	II	1+ 1	1+ 1	1+ 1
03	III	1+ 1	1	1
04	IV	1	1+1	1
05	V	1	1	1+1

SIR C R REDDY COLLEGE ,ELURU
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)
II Year B.Sc. (IV Semester) Model Paper
Subject: **CHEMISTRY**
PAPER – IV : SPECTROSCOPY & PHYSICAL CHEMISTRY

Time:3Hrs

Maximum

Marks:75

Pass Minimum: 26

----- **PART – I**

Answer any FOUR questions choosing atleast one from each section. 4 x 10 =

40M SECTION -A

1.

2.

3.

4.

SECTION – B

5.

6.

7.

8.

PART – II

Answer any FIVE of the following:

9.

5 x 5 =25M

10.

11.

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14.

15.

16

PART – III

Answer any FIVE of the following:

5 x 2 =10M

17.

18.

19.

20.

21.

22.

23.

24.

LABORATORY COURSE –IV
30 hrs (2h/ w)
Practical-IV Titrimetric Analysis
(At the end of semester-IV)

Titrimetric Analysis:

1. Determination of MgSO₄ by using EDTA as a primary standard
2. Determination of ZnSO₄ by using EDTA as a primary standard
3. Determination of Hardness of Water by using EDTA

w.e.f. 2015-16 Admitted batch(CBCS)Pattern

SIR C R REDDY COLLEGE, ELURU
 (Affiliated to Adikavi Nannaya University, Rajamahendravaram)
III Year B.Sc. (V Semester) Syllabus
 Subject: **CHEMISTRY**
Paper-V: Inorganic, Organic & Physical Chemistry

COURSE TITLE	MAJOR CORE 1-INORGANIC, ORGANIC & PHYSICAL CHEMISTRY-1
TOTAL HOURS	45 Hrs
HOURS/WEEK	3T+2P
COURSE CODE	CHE5-3A
COURSE TYPE	THEORY
CREDITS	3+2
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

OBJECTIVES:

To Understand about theories of coordination compounds, isomerism of complex compounds, preparation and properties of carbohydrate, amino acids. To gain knowledge about Thermodynamics

INORGANIC CHEMISTRY

UNIT - I

Coordination Chemistry: (8 hrs)

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, merits and demerits of crystal-field theory. 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: (4 hrs)

Types of magnetic behavior, spin-only formula, calculation of magnetic moments, experimental determination of magnetic susceptibility - Gouy method.

2. Stability of metal complexes: (3 hrs)

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

Carbohydrates (8 hrs)

Monosaccharides: (+) Glucose (aldo hexose) Evidence for cyclic structure of glucose (some negative aldehydes tests and mutarotation). Proof for the ring size (methylation, hydrolysis and oxidation reactions). Pyranose structure (Haworth formula and chair conformational formula). (-)-Fructose (Ketohexose) - Evidence of 2 – ketohexose structure (formation of penta acetate, formation of cyanohydrin its hydrolysis and reduction by HI). Cyclic structure for fructose (Furanose structure and Haworth formula). Osazone formation from glucose and fructose- Definition of anomers with examples.

Interconversion of Monosaccharides: Aldopentose to aldo hexose – (Arabinose to D-Glucose, D-Mannose (Kiliani - Fischer method). Epimers, Epimerisation – Lobry de bruyn van Ekenstein rearrangement. Aldohexose to Aldopentose (D-glucose to D-arabinose) by Ruff's degradation. Aldohexose to ketohexose [(+) (glucose) (-) (Fructose)] and Ketohexose to aldohexose (fructose to Glucose)

UNIT – IV

Amino acids and proteins (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,) 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). Structure and nomenclature of peptides and proteins.

PHYSICAL CHEMISTRY

UNIT – V

Thermodynamics (15 hrs)

The first law of thermodynamics-statement, definition of internal energy and enthalpy. Heat capacities and their relationship. Joule-Thomson effect - coefficient. Calculation of w , for the expansion of perfect gas under isothermal and adiabatic conditions for reversible processes. State function. Temperature dependence of enthalpy of formation. Kirchhoff's equation.

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

Additional curriculum:

1. Alkaloids

Alkaloids – definition, classification. Structural elucidation of coniine

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 Univ
4. Advanced Physical Chemistry by
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 Arunbahl
9. A Text Book of Organic chemistry by I L Finar Vol I
10. Advanced physical chemistry by Gurudeep Raj

Web Links:

7. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.html?id=h3SwSQwsHsYC&redir_esc=y
8. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
9. <https://books.google.co.in/books?id=mnsKyupepQEC&printsec=copyright#v=onepage&q&f=false>

Course outcomes :

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

CO-1 : Understand the basic concepts Coordination Compounds, Spectral and Magnetic properties and Stability of Complexes.

CO-2 : Understand the preparation and properties of Amino acids and basic knowledge on Proteins.

CO-3 : Understand preparation, Structure and Conversions of Glucose and Fructose.

CO-4 : Understand the Laws and properties of Thermodynamics.

Programme specific outcomes :

PSO -1: Co-ordination Chemistry

To gain knowledge about theories of complex compounds.

PSO -2: Spectral and Magnetic properties of Metal Complexes

To gain knowledge about magnetic behaviour of complexes.

PSO-3: Stability of Metal Complexes

To gain knowledge about stability of complexes.

PSO-4: Carbohydrates To gain knowledge about preparation, structure, conversions of Glucose and Fructose.

PSO-5: Amino acids and Proteins

To gain knowledge about preparation and properties of Amino acids.

PSO-6: Thermodynamics

To gain knowledge about Thermodynamic properties

SIR C R REDDY COLLEGE, ELURU

(affiliated to AdikaviNannaya university, Rajamahendravaram)

III BSC - V Semester: subject: Chemistry

Paper: V:Inorganic, Organic & Physical Chemistry

Blue print

Kindly follow the blue print of the syllabus strictly, while preparing the Question paper

S.NO	Unit	Chapters	No. of Essays	No. of Shorts	No. of Very Shorts
1	I	Coordination chemistry	2	2	2
2	II	1.Spectral and magnetic properties of metal complexes	1	1	1
		2.Stability of metal complexes	1	1	1
3	III	Carbohydrates	1	1	1
4	IV	Amino acids, Proteins & Drugs	1	1	1
5	V	Thermodynamics	2	2	2

BLUE PRINT FOR SEMESTER END EXTERNAL EXAMINATION FOR ALL SEMESTERS w.e.f 2015-16 ADMITTED BATCH

S.No	Type of Question	Given in the Question paper			To be answered		
		No. of questions	Marks allotted to each question	Total marks	No. of questions	Marks allotted to each question	Total marks
1.	Part - 1 Essay Questions	8	10	80	4	10	40
2.	Part - 2 Short Questions	8	5	40	5	5	25
3.	Part - 3 Very Short Questions	8	2	16	5	2	10
Total				136			75

$$\text{Percentage of Choice given} = \frac{136-75}{136} \times 100 = 44.8\%$$

SIR C R REDDY COLLEGE, ELURU

(Affiliated to AdikaviNannayauniversity, Rajamahendravaram)

III BSC- CHEMISTRY-SEMESTER-V

**PAPER-V: INORGANIC, ORGANIC & PHYSICAL CHEMISTRY
MODEL PAPER**

Time:3Hrs

Max.marks:75

PART-I

Answer any FOUR questions choosing at least one from each section **4 x 10**
= 40

SECTION -A (Inorganic chemistry)

- 1.
- 2.
- 3.
- 4.

SECTION -B (Organic& Physical chemistry)

- 5.
- 6.
- 7.
- 8.

PART-II

Answer any FIVE of the following **5 X 5**
= 25

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

PART-III

Answer any FIVE of the following **5 x 2**
= 10

- 17.
- 18.
- 19.
- 20.
- 21.
- 22.

23.

24.

LABORATORY COURSE –V

30 hrs (2h/ w)

Practical-VOrganic Analysis

(At the end of semester-V)

**Identify any one of the following Functional group by using
Systematic procedure**

Alcohols, Carboxylic acids ,Phenols, Aldehydes ,Ketones, Amides,
Amines, Nitro Groups, Carbohydrates, Hydrocarbons

SCHEME OF VALUATION :

Practical : 35

Record : 10

Viva : 05

Total -----
 50M

w.e.f. 2015-16 Admitted batch(CBCS)Pattern
SIR C R REDDY COLLEGE, ELURU
 (Affiliated to Adikavi Nannaya University, Rajamahendravaram)
III Year B.Sc. (V Semester) Syllabus
 Subject: **CHEMISTRY**
Paper-VI: Inorganic, Organic & Physical Chemistry
ORGANIC CHEMISTRY

COURSE TITLE	MAJOR CORE 1-INORGANIC,ORGANIC&PHYSICAL CHEMISTRY
TOTAL HOURS	45 Hrs
HOURS/WEEK	3T+2P
COURSE CODE	CHE6-3A
COURSE TYPE	THEORY
CREDITS	3+2
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

Objectives:

To study about the nitro hydrocarbons, heterocyclic compounds, reactivity of metal complexes, bio inorganic chemistry, photochemistry.

UNIT – I

Nitro hydrocarbons:(3hrs)

Nomenclature and classification – nitro hydrocarbons – structure - Tautomerism of nitroalkanes leading to aci and keto form. **Preparation of Nitroalkanes**. **Reactivity** – halogenation, reaction with HONO (Nitrous acid), Nef reaction and Mannich reaction leading to Michael addition and reduction.

UNIT – II

Nitrogen Compounds:(12hrs)

Amines (Aliphatic and Aromatic): Nomenclature, Classification into 1^o, 2^o, 3^o Amines and Quarternary ammonium compounds. Preparative methods -1. **Ammonolysis of alkyl halides**

2. Gabriel synthesis 3. Hoffman's bromamide reaction (mechanism).

4. 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^o, 2^o, 3^o (Aliphatic and aromatic amines).

Electrophilic substitutions of Aromatic amines – Bromination and Nitration. Oxidation of aryl and 3^o Amines. **Diazotization.**

UNIT – III

Heterocyclic Compounds:(7hrs)

Introduction and definition: Classification of Hetero cyclic compounds. Simple 5 membered ring compounds with one hetero atom Ex. **Furan. Thiophene and pyrrole.** Aromatic character – **Preparation** from (a) 1,4,-dicarbonyl compounds only, Paul-Knorr synthesis (b) Acetylene.

Properties: Acidic character of pyrrole, electrophilic substitution at 2 or 5 position, **Reactions of Pyrrole-** Halogenation, (With I₂) Nitration and Sulphonation under mild conditions. **Diels Alder reaction in furan.** Pyridine – Structure - Basicity – Aromaticity – Comparison with pyrrole – two methods of **preparation of pyridine** from (a) 1,5-dicarbonyl compound (glutaraldehyde) (b) Acetylene and properties- Reactivity towards Nucleophilic substitution reactions. (a) Chichibabin reaction b) Reaction with KOH c) With phenyl Lithium d) With n-butyl lithium.

INORGANIC CHEMISTRY

UNIT - IV

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, sources, **biological significance** of Na, K, Mg, Ca, Fe, Co, Ni, Cu, Zn and chloride (Cl⁻). Functions of hemoglobin, **Chlorophyll.**

PHYSICAL CHEMISTRY

UNIT – V

1. Chemical kinetics:(8hrs)

Rate of reaction - Definition of **order and molecularity.** Derivation of rate constants for **first, second, third 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:(5hrs)

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.** **Photosensitized reactions-** energy transfer processes (simple example)

Additional Curriculum: Introduction of Drug, disease. Generic and names: Aspirin, Paracetamol, omeprazole. Classification of drugs on the basis of therapeutic activity. HIV-AIDS: Prevention of AIDS, Drugs available ex: Lamovudine, Zidovudine.

List of Reference Books

1. Concise coordination chemistry by Gopalan and Ramalingam
2. Coordination chemistry by Basalo and Johnson
3. Organic chemistry by G.Mareloudan, Purdue Univ
4. Text book of physical chemistry by S. Glasstone
5. Concise Inorganic chemistry by J.D.Lee
6. Advanced physical chemistry by Atkins
7. Instrumentation and techniques by Chatwal and Anand
8. A text book of physical chemistry by Puri and Sharma
9. Advanced physical chemistry by Gurudeep Raj
10. A text book of organic chemistry by I L Finar Vol 1
11. A text book of organic chemistry by Bhal and Arun bahl
12. Advanced inorganic chemistry Vol-1 by satyaprakash , Tuli, Bala and Madan

Web Link:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechanism.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepOEC&printsec=copyright#v=onepage&q&f=false>

Course outcomes :

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

CO-1 :Understand the preparation and properties of Nitro Hydro Carbons and Amines.

CO-2 :Understand the preparation , properties and reactivity of Hetero Cyclic Compounds.

CO-3 :Understand the Laws of Absorption of Light energy by molecules and the subsequent photo chemical reactions. And also understand the concept of Quantum efficiency and mechanism of Photo chemical reactions.

CO-4 :Understand the Rate of reactions .

CO-5 :Understand the Biological significance of some elements.

Programme specific outcomes :

PSO -1: Nitro Hydro Carbons

To gain knowledge about preparation and properties of Nitro compounds.

PSO -2: Nitrogen Compounds

To gain knowledge about preparation and properties of amines.

PSO-3: Heterocyclic Compounds

To gain knowledge about preparation and properties of Heterocyclic Compounds.

PSO-4: Reactivity of Metal Complexes

To gain knowledge about SN_1 and SN_2 reactions of metal complexes.

PSO-5: Bio-inorganic Chemistry

To gain knowledge about biological significance of some elements.

PSO-6: Chemical Kinetics

To gain knowledge about rate of the reaction, zero, first, second order reactions.

PSO-6: Photochemistry

To gain knowledge about the photochemical laws.

SIR C R REDDY COLLEGE, ELURU
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IIIBSC- V Semester: subject: Chemistry
Paper: VI:Inorganic, Organic & Physical Chemistry
Blue print

Kindly follow the blue print of the syllabus strictly, while preparing the Question paper

S.NO	Unit	Topic	No. of Essays	No. of Shorts	No. of Very Shorts
1	I	Nitro hydrocarbons	1	1	1
2	II	Nitrogen compounds	1	1	1
3	III	Heterocyclic compounds	1	1	1
4	IV	1.Reactivity of metal complexes 2.Bioinorganic chemistry & Drugs	1 -	1 1	- 2
5	V	1.Chemical Kinetics 2.Photochemistry	2 2	1 2	2 1

**BLUE PRINT FOR SEMESTER END EXTERNAL EXAMINATION FOR
 ALL SEMESTERS w.e.f 2015-16 ADMITTED BATCH**

S.No	Type of Question	Given in the Question paper			To be answered		
		No. of questions	Marks allotted to each question	Total marks	No. of questions	Marks allotted to each question	Total marks
1.	Part - 1 Essay Questions	8	10	80	4	10	40
2.	Part - 2 Short Questions	8	5	40	5	5	25
3.	Part - 3 Very Short Questions	8	2	16	5	2	10
Total				136			75

$$\text{Percentage of Choice given} = \frac{136-75}{136} \times 100 = 44.8\%$$

SIR C R REDDY COLLEGE, ELURU
(Affiliated to AdikaviNannayauniversity, Rajamahendravaram)
IIIBSC- CHEMISTRY-SEMESTER-V
PAPER-VI: INORGANIC, ORGANIC & PHYSICAL CHEMISTRY
MODEL PAPER

Time:3Hrs

Max.marks:75

PART-I

Answer any FOUR questions choosing at least one from each section **4 x 10**
= 40

SECTION -A (Organic &Inorganic chemistry)

- 1.
- 2.
- 3.
- 4.

SECTION -B (Physical chemistry)

- 5.
- 6.
- 7.
- 8.

PART-II

Answer any FIVE of the following **5 X 5**
= 25

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

PART-III

Answer any FIVE of the following **5 x 2**
= 10

- 17.
- 18.
- 19.
- 20.
- 21.
- 22.
- 23.
- 24.

LABORATORY COURSE –VI
30 hrs (2h/ w)
Practical-VI Physical chemistry
(At the end of semester-V)

1. Determination of surface tension of liquid.
2. Determination of Viscosity of liquid.

SCHEME OF VALUATION :

Practical : 35

Record : 10

Viva : 05

Total	50M

SIR C R REDDY COLLEGE, ELURU
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IIIB.Sc – CHMISTRY –SEMESTER-VI

PAPER – VII-A : ANALYTICAL METHODS IN CHEMISTRY

45hrs (3 h/w)

COURSE TITLE	MAJOR CORE 1 ANALYTICAL METHODS IN CHEMISTRY
TOTAL HOURS	45 Hrs
HOURS/WEEK	3 T+2P
COURSE CODE	CHE-1A
COURSE TYPE	THEORY
CREDITS	3T+2P
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

UNIT-I

10 h

Quantitative analysis:

- 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.
- b) Principles of gravimetric analysis: precipitation, coagulation, peptization, co-precipitation, post precipitation, digestion, filtration and washing of precipitate, drying and ignition.

UNIT-II

7h

Treatment of analytical data:

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:

8 h

Introduction, principle, techniques, factors affecting solvent extraction, Batch

extraction, continuous extraction and counter current extraction. Synergism.,
Application - Determination of Iron (III)

Ion exchange : Introduction, action of ion exchange resins, separation of inorganic mixtures, applications, Solvent extraction: Principle and process.

UNIT-IV**10 h**

Chromatography: Classification of chromatography methods, principles of differential migration and 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**10 h**

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.

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

Web Links

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechan.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepQEC&printsec=copyright#v=onepage&q&f=false>

SIR C R REDDY COLLEGE, ELURU

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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VII-A : ANALYTICAL METHODS IN CHEMISTRY

BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions
01	I	1+1	1+1
02	II	1	1
03	III	1	1+1
04	IV	1+1	1+1
05	V	1+1	1

SIR C R REDDY COLLEG, ELURU
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)
III Year B.Sc. (VI Semester) Model Paper
Subject: **CHEMISTRY**

PAPER – VII-A : ANALYTICAL METHODS IN CHEMISTRY

Time:3Hrs

Maximum Marks:75
Pass Minimum: 26

SECTION - A

Answer any FIVE of the following.

5 x 10 = 50M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION – B

Answer any FIVE of the following:

5 x 5 = 25M

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

CHEMISTRY LABORATORY COURSE – VII-A
(at the end of semester VI)

30 hrs (2 h / w)

50 Marks

1. Identification of amino acids by paperchromatography.
2. Determination of Zn usingEDTA
3. Determination of Mg usingEDTA

w.e.f. 2015-16 Admitted batch(CBCS)Pattern
SIR C R REDDY COLLEGE, ELURU
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)

III Year B.Sc. (VI Semester) Syllabus

Subject: **CHEMISTRY**

PAPER-VII-B : ENVIRONMENTAL CHEMISTRY

COURSE TITLE	MAJOR CORE 1- ENVIRONMENTAL CHEMISTRY
TOTAL HOURS	45 Hrs
HOURS/WEEK	3 T+2P
COURSE CODE	CHE7-3B
COURSE TYPE	THEORY
CREDITS	3+2
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

Objectives

To understand about Air Pollution , Water pollution, Chemical Toxicology, Ecosystem, Solid Waste management, Disaster management.

UNIT-I

9 h

Introduction

Concept of Environmental chemistry - Scope and importance of environment in now a days – Nomenclature of environmental chemistry – Segments of environment - Natural resources – Renewable Resources – Solar and biomass energy, Hydro power and Non-renewable resources – Thermal power and atomic energy, natural gas – Oxygen cycle and Hydological cycle.

UNIT-II

Air Pollution

9 h

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 – 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 effects – **toxicity of lead, mercury, arsenic and cadmium.**

UNIT-V

9h

- (a) **Ecosystem** : Concepts – structure – Functions and types of ecosystem – **Abiotic and biotic components** – Energy flow and Energy dynamics of ecosystem – Food chains – Food web – Tropic levels.
- (b) **Solid Waste management:** **Biodegradable– Non biodegradable waste** – Types of solid waste disposable – Landfill – Composition – Incineration – Recycling – **Pyrolysis** – Reduction in use.
- (c) **Disaster management** : **Floods – Drought – Earthquakes – Cyclones**

Additional Syllabus:

Biodiversity: Definition – level and types of biodiversity – concept - significance – magnitude and distribution of biodiversity – trends – bio geographical classification of India – biodiversity at national, global and regional level.

List of Reference Books

1. Fundamental 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.Banerj

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepQEC&printsec=copyright#v=onepage&q&f=false>

Course Outcomes:

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

CO-1 : Understand the basic concepts of environmental chemistry, scope and importance of environment in now a days .

CO-2 : Understand the basic concepts of air pollution-sources of air pollution -controlling methods of air pollution.

CO-3 : Understand the basic concepts of water quality and criteria for finding of water quality-methods to convert temporary hard water into soft water, methods to convert permanent hard water into soft water.

CO-4 : Understand the basic concepts of toxic chemicals in the environment –effects of toxic chemicals.

CO-5 : Understand the basic concepts of Eco system functions and types of Eco

system.

Programme specific Outcomes:

PSO-1 : INTRODUCTION-CONCEPT OF ENVIRONMENT CHEMISTRY:

To gain knowledge about scope and importance of environment in now a days

PSO-2 : AIR POLLUTION:

To gain knowledge about air pollution-sources of air pollution –controlling methods of air pollution.

PSO-3 : WATER POLLUTION:

To gain knowledge about water quality and criteria for finding of water quality-methods to convert temporary hard water into soft water, methods to convert permanent hard water into soft water.

PSO-4 : CHEMICAL TOXICOLOGY:

To gain knowledge about toxic chemicals in the environment –effects of toxic chemicals.

PSO-5 : ECO SYSTEM,SOLID WASTE MANAGEMENT& DISASTER MANAGEMENT:

To gain knowledge about functions and types of Eco system, solid waste management, Disaster management.

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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VII-B : ENVIRONMENTAL CHEMISTRY

BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions
01	I	1+1	1+1
02	II	1	1
03	III	1+1	1+1
04	IV	1	1
05	V	(a)-1 (b)-1 (c)--	- 1 1

SIR C R REDDY COLLEGE, ELURU
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)
III Year B.Sc. (VI Semester) Model Paper
Subject: **CHEMISTRY**

PAPER – VII-B : ENVIRONMENTAL CHEMISTRY

Time:3Hrs

Maximum

Marks:75

Pass Minimum:

26

SECTION - A

Answer any FIVE of the following.

5 x 10 = 50M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION – B

Answer any FIVE of the following:

5 x 5 = 25M

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

CHEMISTRY LABORATORY COURSE – VII-B

(at the end of semester VI)

30 hrs (2 h /w)

50Marks

1. Determination of carbonate and bicarbonate in water samples (acidity and alkalinity)
2. Determination of hardness of water using EDTA
 - a) Permanent hardness
 - b) Temporary hardness
3. Determination of Acidity
4. Determination of Alkalinity
5. Determination of chlorides in water samples

SIR C R REDDY COLLEGE, ELURU

(Affiliated to Adikavi Nannaya University, Rajamahendravaram)

III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VII-C : GREEN CHEMISTRY

45hrs (3 h/w)

COURSE TITLE	MAJOR CORE 1 GREEN CHEMISTRY
TOTAL HOURS	45Hrs
HOURS/WEEK	3T+2P
COURSE CODE	CHE-1A
COURSE TYPE	THEORY
CREDITS	3T+2P
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

UNIT-I

10 h

Green Chemistry: Introduction - Definition of green chemistry, need of green chemistry, basic principles of green chemistry. Green synthesis - Evaluation of the type of the reaction i) Rearrangements (100% atom economic), ii) Addition reactions (100% atom economic). Organic reactions by Sonication method: apparatus required examples of sonochemical reactions (Heck, Hunsdiecker and Wittig reactions).

UNIT-II

10 h

Selection of solvent: i) Aqueous phase reactions ii) Reactions in ionic liquids, Heck reaction, Suzuki reactions, epoxidation. iii) Solid supported synthesis Super critical CO₂: Preparation, properties and applications, (decaffeination, dry cleaning)

UNIT-III

10 h

Microwave and Ultrasound assisted green synthesis: Apparatus required, examples of MAOS (synthesis of fused anthro quinones, Leuckart reductive amination of ketones) - Advantages and disadvantages of MAOS Aldol condensation-Cannizzaro reaction-Diels-Alder reactions-Strecker's synthesis.

UNIT-IV

5 h

Green catalysis: Heterogeneous catalysis, use of zeolites, silica, alumina, supported catalysis- biocatalysis: Enzymes, microbes Phase transfer catalysis (micellar/surfactant)

UNITV

10 h

Examples of green synthesis / reactions and some real world cases: 1. Green synthesis of the following compounds: adipic acid, catechol, disodium iminodiacetate (alternative Strecker's synthesis) 2. Microwave assisted reaction in water – Hoffmann elimination – methyl benzoate to benzoic acid – oxidation of toluene and alcohols – microwave assisted reactions in organic solvents. Diels-Alder reactions and decarboxylation reaction. 3. Ultrasound assisted reactions – sonochemical Simmons –Smith reaction (ultrasonic alternative to iodine).

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

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechan.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepQEC&printsec=copyright#v=onepage&q&f=false>

SIR C R REDDY COLLEGE, ELURU

(Affiliated to Adikavi Nannaya University, Rajamahendravaram)

III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VII-C : GREEN CHEMISTRY

BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions
01	I	1+1	1+1
02	II	1	1+1
03	III	1+1	1
04	IV	1	1
05	V	1+1	1+1

SIR C R REDDY COLLEGE, ELURU
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)
III Year B.Sc. (VI Semester) Model Paper
Subject: **CHEMISTRY**

PAPER – VII-C : GREEN CHEMISTRY

Time:3Hrs

Maximum Marks:75

Pass Minimum: 26

SECTION - A

Answer any FIVE of the following.

5 x 10 = 50M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION – B

Answer any FIVE of the following:

5 x 5 = 25M

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

CHEMISTRY LABORATORY COURSE – VII-C

(at the end of semester VI)

30 hrs (2 h /w)

50Marks

1. Green procedure for organic qualitative analysis: Detection of N, S and halogens
2. Acetylation of 1^o 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

SIR C R REDDY COLLEGE, ELURU

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III B.Sc – CHEMISTRY – SEMESTER-VI

PAPER – VIII-A-1 : POLYMER CHEMISTRY

45hrs (3 h/w)

COURSE TITLE	MAJOR CORE 1 POLYMER CHEMISTRY
TOTAL HOURS	45 Hrs
HOURS/WEEK	3 T+2P
COURSE CODE	CHE-1A
COURSE TYPE	THEORY
CREDITS	3T+2P
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

UNIT-I

12 h

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, Fibres and Resins, Linear, Branched and Cross Linked polymers, Addition polymers and Condensation Polymers, mechanism of polymerization. Free radical, ionic and Zeigler – Natta polymerization.

UNIT-II

10 h

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 and Osmometry methods.

UNIT-III

6 h

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

9 h

Polymeradditives:

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, Nucleatingagents.

UNIT-V

8 h

Polymers and their applications:

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

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,1991.34
5. Lenz, R.W. Organic Chemistry of Synthetic High Polymers. Interscience Publishers, NewYork,1967.

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepOEC&printsec=copyright#v=onepage&q&f=false>

SIR C R REDDY COLLEGE, ELURU
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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-A-1 : POLYMER CHEMISTRY

BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions
01	I	1+1	1+1
02	II	1+1	1
03	III	1	1
04	IV	1+1	1+1
05	V	1	1+1

SIR C R REDDY COLLEGE, ELURU

(Affiliated to Adikavi Nannaya University, Rajamahendravaram)

III Year B.Sc. (VI Semester) Model Paper

Subject: **CHEMISTRY**

PAPER – VIII-A-1 : POLYMER CHEMISTRY

Time:3Hrs

Marks:75

Maximum

Pass

Minimum:

26

SECTION - A

Answer any FIVE of the following.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION – B

Answer any FIVE of the following:

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

LABORATORY COURSE –VIII

30 hrs (2h/ w)

Practical paper-VIII-A1

(At the end of semester-VI)

- 1.Preparation of Aspirin
- 2.Preparation of Paracetamol
- 3.Preparation of acetanilide
- 4.Preparation of barbutiric acid
- 5.Preparation of phenyl azo β -Naphthol

SIR C R REDDY COLLEGE, ELURU

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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-A-2 : INSTRUMENTAL METHODS OF ANALYSIS

45hrs (3 h/w)

COURSE TITLE	MAJOR CORE 1 INSTRUMENTAL METHODS OF ANALYSIS
TOTAL HOURS	45 Hrs
HOURS/WEEK	3T+2P
COURSE CODE	CHE-1A
COURSE TYPE	THEORY
CREDITS	3T+2P
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

UNIT – I

Introduction to spectroscopic methods of analysis:

4 h

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

Molecular spectroscopy:

8 h

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.

UNIT-III

10 h

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

Separation

techniques

15 h

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). Mass spectrometry: 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

Elemental analysis:

8 h

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.

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. & Settle, 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

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.h

- [tml?id=h3SwSQwsHsYC&redir_esc=y](https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/)
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
 3. <https://books.google.co.in/books?id=mnsKyupepQEC&printsec=copyright#v=onepage&q&f=false>

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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-A-2 : INSTRUMENTAL METHODS OF ANALYSIS

BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions
01	I	1	1
02	II	1	1
03	III	1+1	1+1
04	IV	1+1	1+1
05	V	1+1	1+1

SIR C R REDDY COLLEGE, ELURU

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III Year B.Sc. (VI Semester) Model Paper

Subject: **CHEMISTRY**

PAPER – VIII-A-2 : INSTRUMENTAL METHODS OF ANALYSIS

Time:3Hrs

Marks:75

Maximum

Pass

Minimum:

26

SECTION - A

Answer any **FIVE** of the following.

5 x 10 = 50M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION – B

Answer any **FIVE** of the following:

5 x 5 = 25M

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

LABORATORY COURSE –VIII

30 hrs (2h/ w)

Practical paper-VIII-A2

(At the end of semester-VI)

- 1.Green procedure for Organic qualitative analysis detection of nitrogen , sulphur and halogens.
- 2.Acetylation of primary amine by green method: Preparation of acetanilide
- 3.Rearrangement reactions in green condition: 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

SIR C R REDDY COLLEGE, ELURU
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III B.Sc – CHMISTRY – SEMESTER-VI

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

45hrs (3 h/w)

COURSE TITLE	MAJOR CORE 1 ANALYSIS OF DRUGS, FOODS, DAIRY PRODUCTS & BIO-CHEMICAL ANALYSIS
TOTAL HOURS	45 Hrs
HOURS/WEEK	3 T+2P
COURSE CODE	CHE-1A
COURSE TYPE	THEORY
CREDITS	3T+2P
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

UNIT- I

10 h

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, penicillin, tetracycline. Anti tuberculous drug-isoniazid.

UNIT-II

6 h

Analysis of the following drugs and pharmaceuticals preparations: (Knowledge of molecular formula, structure and analysis) Analysis of antihistamine drugs and sedatives like allegra, zyrtec (cetirizine), alprazolam, trazodone, lorazepam, ambien (zolpidem), diazepam.

UNIT-III

10 h

Analysis of anti epileptic and anti convulsant drugs like phenobarbital and phenacetamide. Analysis of cardiovascular drugs like atenolol, norvasc (amlodipine). Analysis of lipitor (atorvastatin) - a drug for the prevention of production of cholesterol. Analysis of diuretics like furosemide (Lasix). Analysis of prevacid (lansoprazole) - a drug used for the prevention of production of acids in stomach.

UNIT-IV

10 h

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 matters - Brilliant blue FCF, fast green FCF, sunset yellow FCF. Flavoring agents - Vanilla, diacetyl, isoamyl acetate, limonene. Adulterants in rice and wheat, wheat floor, coconut oil, coffee powder, tea powder, **milk**.

UNIT-V

9 h

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.

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. Analytical Agricultural 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.

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechanism?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepQEC&printsec=copyright#v=onepage&q&f=false>

SIR C R REDDY COLLEGE, ELURU

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III B.Sc – CHMISTRY – SEMESTER-VI

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

BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions
01	I	1+1	1+1
02	II	1	1
03	III	1+1	1+1
04	IV	1+1	1+1
05	V	1	1

SIR C R REDDY COLLEGE, ELURU

(Affiliated to Adikavi Nannaya University, Rajamahendravaram)

III Year B.Sc. (VI Semester) Model Paper

Subject: **CHEMISTRY**

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

Time:3Hrs

Maximum

Marks:75

Pass Minimum:

26

SECTION - A

Answer any FIVE of the following.

5 x 10 = 50M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION – B

Answer any FIVE of the following:

5 x 5 = 25M

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

w.e.f. 2015-16 Admitted batch(CBCS)Pattern

SIR C R REDDY COLLEGE, ELURU
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)
III B.Sc – CHMISTRY – SEMESTER-VI
Paper-VIII-B-1: Fuel Chemistry and Batteries

45hrs (3 h/w)

COURSE TITLE	MAJOR CORE 1- PAPER-VII-B-1: FUEL CHEMISTRY AND BATTERIES
TOTAL HOURS	45 Hrs
HOURS/WEEK	3T+2P
COURSE CODE	CHE8-1-3B
COURSE TYPE	THEORY
CREDITS	3+2
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

Objectives

To understand about Review of energy sources(renewable and non-renewable), Petroleum and petrol chemical industry Fractional distillation, Petroleum and Non-Petroleum Fuels, Lubricants, Batteries

UNIT-I

12h

Review of energy sources (renewable and non-renewable) – classification of fuels and their calorific value. Coal: Uses of Coal (fuel and non-fuel) in various industries, its composition, carbonization of coal – coal gas, producer gas and water gas – composition and uses – fractionation of coal tar – uses of coal tar based chemicals, requisites of a good metallurgical coke, coal gasification (Hydro gasification and catalytic gasification) coal liquefaction .

UNIT-II

6h

Petroleum and petrol chemical industry:

Composition of crude petroleum, refining and different types of petroleum products and

their applications

UNIT-III

10h

Fractional distillation (principal and process), cracking (Thermal and catalytic cracking). Reforming petroleum and non-petroleum fuels (LPG, CNG, LNG, Biogas), fuels derived from biomass, synthetic fuels (gaseous and liquids), petro chemicals, vinyl acetate, propylene oxide.

UNIT-IV

10h

Lubricants:

Classification of lubricants, lubricating oils (conducting and non-conducting), solid and semi solid lubricants, synthetic lubricants. Properties of lubricants (viscosity index, cloud point, pore point) and their determination.

UNIT-V

7h

Batteries:

Primary and secondary batteries, battery components and their role, characteristics of Battery. Working of following batteries: Pb acid, Fuel cells, Solar cell and polymer cell.

Additional Syllabus:

Coal tar distillation with excess matter, solvent refining.

Petrochemicals : Isoprene, butadiene and toluene

REFERENCE BOOKS

1. E.Stocchi : Industrial chemistry , Vol-1, Ellis Horwood Ltd.UK.
2. P.C.Jain, M.Jain: Engineering chemistry, Dhanpat Rai & sons,Delhi.
3. B.K.Sharma: Industrial Chemistry, Goel Publishing house,Meerut.

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepQEC&printsec=copyright#v=onepage&q&f=false>

Course Outcomes:

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

CO-1 : Understand the basic concepts of various industrial applications, compositions and uses of coal tar in metallurgy.

CO-2 : Understand the basic concepts of types of petroleum products and refining techniques.

CO-3 : Understand the basic concepts of LPC, CNG, LNG biogas fuels derived from biomass

CO-4 : Understand the basic concepts of solid and semi solid lubricants, viscosity index ,cloud point, pour point and their determinations.

CO-5 : Understand the basic concepts of battery components and their rolls, characteristics of batteries.

Programme specific Outcomes:

PSO-1 :Review of energy sources(renewable and non-renewable):

To gain knowledge about the basic concepts of various industrial applications, composition and uses of coal tar in metallurgy.

PSO-2 :Petroleum and petro chemical industry:

To gain knowledge about Understand the basic concepts of types of petroleum products and refining techniques

PSO-3 :Fractional distillation, Petroleum and Non-Petroleum Fuels:

To gain knowledge about the LPC,CNG, LNG biogas fuels derived from biomass

PSO-4 :Lubricants:

To gain knowledge about the solid and semi solid lubricants, viscosity index ,cloud point, pour point and their determinations.

PSO-5 :Batteries:

To gain knowledge about the battery components and their rolls, characteristics of batteries

SIR C R REDDY COLLEGE, ELURU

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III B.Sc – CHMISTRY – SEMESTER-VI

Paper-VIII-B-1: Fuel Chemistry and Batteries

BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions
01	I	1+1	1+1
02	II	1	1
03	III	1+1	1+1
04	IV	1+1	1+1
05	V	1	1

SIR C R REDDY COLLEGE, ELURU
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)
III Year B.Sc. (VI Semester) Model Paper
Subject: **CHEMISTRY**
Paper-VIII-B-1: Fuel Chemistry and Batteries

Time:3Hrs
Marks:75

Maximum

Pass Minimum:

26

SECTION - A

Answer any **FIVE** of the following.

5 x 10 = 50M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION – B

Answer any **FIVE** of the following:

5 x 5 = 25M

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

SIR C R REDDY COLLEGE, ELURU
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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-B-2 : INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

45hrs (3 h/w)

COURSE TITLE	MAJOR CORE 1-PAPER – VIII-B-2 : INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE
TOTAL HOURS	45 Hrs
HOURS/WEEK	3 T+2P
COURSE CODE	CHE8-2-3B
COURSE TYPE	THEORY
CREDITS	3+2
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

Objectives

To understand about Recapitulation of s- and p-Block Elements, Silicate Industries, Fertilizers, Polymers, Alloys, Chemical explosives

UNIT-I

9 h

Recapitulation of s- and p-Block Elements.

Periodicity of s- and p-block elements with respect to electronic configuration, atomic and ionic size, ionization enthalpy – factors effecting ionization enthalpy, electronegativity – estimation of electronegativity by Pauling, Mulliken and Alfred – Rochow scales. Allotropy, allotropes of C, S, and P. Oxidation states, inert pair effect, diagonal relationship and anomalous behaviour of first member of each group.

UNIT- II

8 h

Silicate Industries

Glass: Glassy state and its properties, classification. Manufacturing and processing of glass. Composition and properties of the following types of glasses - Soda lime glass, lead glass, safety glass, Boro silicate glass, coloured glass and Photo sensitive glass

Cement : Classification of cement, ingredients and their role, Manufacture of cement and the setting process.

UNIT -III

9 h

Fertilizers: Definition, classification of fertilizers. Manufacture of the following fertilizers Urea, ammonium nitrate, calcium ammonium nitrate, ammonium phosphate, polyphosphate and superphosphate of lime. Compound and mixed fertilizers, potassium chloride, potassium sulphate.

UNIT-IV

10h

Polymers : Definition, classification of polymers. Molecular weight of polymers – number average

and weight average molecular weights. Determination of molecular weight of polymers by Osmometry.

Polymers and their applications – Preparation and industrial applications of polyethylene, poly vinyl chloride, Teflon, poly acrylo nitrile, Terelene and Nylon-6,6.

UNIT -V

9 h

Alloys: Definition Classification of alloys, ferrous and non-ferrous alloys – Examples. Manufacture of Steel. Composition and significance of different types of Steels – Heat resisting steel, stainless steel, spring steel and tool steel.

Chemical explosives: Definition and characteristics of explosives. Preparation and significance of lead azide, PETN, Cyclonite (RDX). Introduction to Rocket propellents.

Additional Syllabus: Ceramics: Important clays and feldspar, ceramics, their types and manufacture. High technology ceramics and their applications.

REFERENCE BOOKS

1. E. Stocchi: Industrial Chemistry, Vol-I, Ellis Horwood Ltd.UK.
2. R. M. Felder, R. W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.
3. W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics, Wiley Publishers, New Delhi.
4. J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.
5. P. C. Jain & M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.
6. R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry, Vikas Publications, New Delhi.
B. K. Sharma: Engineering Chemistry, Goel Publishing House, Meerut.

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechan.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepQEC&printsec=copyright#v=onepage&q&f=false>

Course Outcomes:

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

CO-1 : Understand the basic concepts of Electronic configuration, atomic size, ionisation enthalpy, diagonal relationship

CO-2 : Understand the basic concepts of composition and properties of glasses and

manufacture of cement.

CO-3 : Understand the basic concepts of super phosphate of lime, compound and mixed fertilizers

CO-4 : Understand the basic concepts of polymer application, industrial applications and preparation, uses of PVC, nylon

CO-5 : Understand the basic concepts of composition of different types of alloys ,stainless steels, tool steel uses. Rocket

Programme specific Outcomes:

PSO-1 : Recapitulation of s- and p-Block Elements:

To gain knowledge on Electronic configuration, atomic size, ionisation enthalpy ,diagonal relationship

PSO-2 : Silicate industries:

To gain knowledge about the composition and properties of glasses and manufacture of cement.

PSO-3 :Fertilizers:

To gain knowledge on of composition of different types of alloys ,stainless steels, tool steel uses. rocket

PSO-4 :Surface Coatings:

To gain knowledge on of polymer application, industrial applications and preparation, uses of PVC, nylon

PSO-5 : Alloys:

To gain knowledge on composition and properties of glasses and manufacture of copellents.

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(Affiliated to Adikavi Nannaya University, Rajamahendravaram)

III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-B-2 : INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions
01	I	1+1	1
02	II	1	1+1
03	III	1+1	1
04	IV	1+1	1+1
05	V	1	1+1

SIR C R REDDY COLLEGE, ELURU

(Affiliated to Adikavi Nannaya University, Rajamahendravaram)

III Year B.Sc. (VI Semester) Model Paper

Subject: **CHEMISTRY**

PAPER – VIII-B-2 : INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

Time:3Hrs

Maximum

Marks:75

Pass Minimum:

26

SECTION - A

Answer any FIVE of the following.

5 x 10 = 50M

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION – B

Answer any FIVE of the following:

5 x 5 = 25M

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

SIR C R REDDY COLLEGE, ELURU
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)
III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-B-3 : ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS

45hrs (3 h/w)

COURSE TITLE	MAJOR CORE 1-PAPER – VIII-B-3 : : I ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS
TOTAL HOURS	45 Hrs
HOURS/WEEK	3T+2P
COURSE CODE	CHE8-3-3B
COURSE TYPE	THEORY
CREDITS	3+2
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

Objectives:

To understand about Analysis of soaps, Analysis of oils, Analysis of Fertilizers, Gas analysis, Separation techniques.

UNIT-I

9 h

Analysis of **soaps** :moisture and volatile matter, combined alkali, total fatty matter, free alkali and total fatty acid.
Analysis of **paints** : Vehicle and pigments, Barium Sulphate, total lead and lead chromate.

UNIT- II

8 h

Analysis of oils : saponification value, iodine value and acid value.
Analysis of fertilizers : Determination of ammonia in ammonical fertilizers, determination of nitrogen in **nitrate fertilizers** and determination of phosphorous in phosphate fertilizers.

UNIT -III

9 h

Gas analysis: carbon dioxide, carbon monoxide, oxygen, hydrogen, and nitrogen.
Analysis of Fuel gases like: water gas and producer gas.
Ultimate analysis : carbon, hydrogen, nitrogen, oxygen, phosphorus and sulphur.

UNIT-IV

9 h

SOLVENT EXTRACTION :Introduction, principle, distribution law, factors affecting solvent extraction, types of solvent extraction techniques - Batch extraction, continuous extraction and counter current extraction. Application - Determination of Iron (III)

CHROMATOGRAPHY :Classification of **chromatographic methods**, principles of differential migration adsorption phenomenon, **R_f values**, factors effecting R_f values.

PAPER CHROMATOGRAPHY :Principles, R_f values, experimental procedures, choice of paper and solvent systems, development of chromatogram - ascending, descending and radial. Two dimensional chromatography, applications.

UNIT -V

10h

THIN LAYER CHROMATOGRAPHY :Advantages, Principles, factors effecting R_f values. Experimental procedure, Adsorbents and solvents. Preparation of plates, development of chromatogram, detection of the spots. Applications.

COLUMN CHROMATOGRAPHY :Principles, experimental procedures, Stationary and mobile Phases, Separation technique. Applications.

HPLC :Basic principles and applications.

Additional Syllabus: Analysis of cement- loss on ignition, insoluble residue, total silica, sesqui oxides, lime, magnesia, ferric oxide.

REFERENCE BOOKS

1. F.J.Welcher - Standard methods of analysis.
2. A.I.Vogel - A text book of quantitative Inorganic analysis - ELBS.
3. H.H.Willard and H.Deal - Advanced quantitative analysis - Van NostrandCo.
4. F.D.Snell & F.M.Biffen - Commercial methods of analysis - D.B.Taraporavala & sons.
5. 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.
6. G.Z.Weig - Analytical methods for pesticides, plant growth regulators and food additives - Vols I to VII.
7. S.L.Chopra & J.S.Kanwar - A analytical Agricultrual Chemistry - KalyaniPublishers.
8. R.M.Upadhyay and N.L. Sharma - Manual of soil, plant, water and fertilizer analysis - KalyaniPublishers.

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepQEC&printsec=copyright#v=onepage&q&f=false>

Course Outcomes:

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

CO-1 :Understand the basic concepts of constituents of soaps and paints and analysis of soaps and paints

CO-2 :Understand the basic concepts of constituents oils and fertilizers and analysis of oils and fertilizers.

CO-3 :Understand the basic concepts of mixture of gases present in fuel gases and coal gas and their analysis

CO-4 :Understand the basic concepts of different separation techniques of solvent extraction

CO-5 :Understand the basic concepts of separation techniques of column and chromatography ,Thin layer chromatography, And HPLC ,Applications of these techniques in different industries.

Programme specific Outcomes:

PSO-1 :Analysis of soaps :

To gain knowledge about the constituents of soaps and paints and analysis of soaps and paints

PSO- 2 :Analysis of oils :

To gain knowledge about the constituents oils and fertilizers and analysis of oils and fertilizers.

PSO- 3 :Analysis of Fertilizers:

To gain knowledge about the mixture of gases present in fuel gases and coal gas and their analysis

PSO-4 :Gas analysis :

To gain knowledge about the different separation techniques of solvent extraction

PSO-5 :Separation techniques:

To gain knowledge about separation techniques of column and chromatography, Thin layer chromatography, And HPLC. Applications of these techniques in different industries

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III B.Sc – CHMISTRY – SEMESTER-VI***PAPER – VIII-B-3 : ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS*****BLUE PRINT**

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions
01	I	1+1	1+1
02	II	1	1
03	III	1+1	1
04	IV	1+1	1+1
05	V	1	1+1

SIR C R REDDY COLLEGE, ELURU
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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-B-3 : ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS

Time:3Hrs

Maximum Marks:75

Pass Minimum: 26

SECTION - A

Answer any FIVE of the following.

5 x 10 = 50M

- 1.
- 2.
- 3.
- 4.
- 5.
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- 7.
- 8.

SECTION – B

Answer any FIVE of the following:

5 x 5 = 25M

- 9.
- 10.
- 11.
- 12.
- 13.
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- 15.
- 16.

III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-C-1 : ORGANIC SPECTROSCOPIC TECHNIQUES

45hrs (3 h/w)

COURSE TITLE	MAJOR CORE 1 ORGANIC SPECTROSCOPIC TECHNIQUES
TOTAL HOURS	45 Hrs
HOURS/WEEK	3T+2P
COURSE CODE	CHE-1A
COURSE TYPE	THEORY
CREDITS	3T+2P
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

UNIT-I

10 h

Nuclear Magnetic Resonance Spectroscopy

Nuclear spin, Principles of NMR-Classical and Quantum Mechanical methods, Magnetic moment and Spin angular momentum. Larmor Frequency. Instrumentation. Relaxation - spin-spin & spin lattice relaxation. Shielding constants, Chemical shifts, Shielding and Deshielding mechanism-Factors influencing Chemical shift. Spin-Spin interactions - AX, AX₂ and AB types, factors influencing coupling constant.

UNIT- II

5 h

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

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

UNIT-IV

5 h

Electronic spectra of polyatomic molecules. Chemical analysis by Electronic Spectroscopy – Beer-Lambert's Law. Deviation from Beer's law. Quantitative determination of metal ions (Mn⁺², Fe⁺², NO⁻, Pb⁺²). Simultaneous determination of Chromium and Manganese in a mixture.

Electron Spin Resonance Spectroscopy

Basic Principles, Theory of ESR, Comparison of NMR & ESR. Instrumentation, Factors affecting the 'g' value, determination of 'g' value. Isotropic and Anisotropic constants. Splitting hyperfine splitting coupling constants. Linewidth, Zero field splitting and Kramer degeneracy. Crystal field splitting, Crystal field effects. Applications:- Detection of free radicals - ESR spectra of Methyl radical ($\text{CH}_3\cdot$), Benzene anion (C_6H_6^-).

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. Application of Mössbauer Spectroscopy – Green Mood.
7. NMR, NQR, EPR and Mössbauer Spectroscopy in inorganic chemistry – R.V. Parish, Ellis, Harwood.
8. Instrumental Methods of Chemical Analysis - H. Kaur, Pragathi Prakashan, 2003.
9. Instrumental Methods of Analysis, 7th Edition – Willard, Merritt, Dean, Settle, CBS Publications, 1986.
10. Molecular Structure and Spectroscopy – G. Aruldas, Prentice Hall of India Pvt. Ltd, New Delhi, 2001.
11. Mössbauer Spectroscopy – N.N. Greenwood and T.C. Gibb, Chapman and Hall, London 1971.
12. Coordination Chemistry: Experimental Methods - K. Burger, London Butter Worths, 1973.
13. Analytical spectroscopy – Kamlesh Bansal, Campus books, 2008.
14. Structural Inorganic Chemistry Mössbauer Spectroscopy – Bhide.
15. Principle of Mössbauer Spectroscopy – T.C. Gibb, Chapman and Hall, London 1976.

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepOEC&printsec=copyright#v=onepage&q&f=false>

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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-C-1 : ORGANIC SPECTROSCOPIC TECHNIQUES

BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions
01	I	1+1	1+1
02	II	1	1
03	III	1+1	1
04	IV	1	1+1
05	V	1+1	1+1

SIR C R REDDY COLLEGE, ELURU
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III Year B.Sc. (VI Semester) Model Paper

Subject: **CHEMISTRY**

PAPER – VIII-C-1 : ORGANIC SPECTROSCOPIC TECHNIQUES

Time:3Hrs

Maximum Marks:75

Pass Minimum: 26

SECTION - A

Answer any FIVE of the following.

5 x 10 = 50M

- 1.
- 2.
- 3.
- 4.
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SECTION – B

Answer any FIVE of the following:

5 x 5 = 25M

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SIR C R REDDY COLLEGE, ELURU
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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-C-2 : ADVANCED ORGANIC REACTIONS

45hrs (3 h/w)

COURSE TITLE	MAJOR CORE 1 ADVANCED ORGANIC REACTIONS
TOTAL HOURS	45 Hrs
HOURS/WEEK	3T+2P
COURSE CODE	CHE-1A
COURSE TYPE	THEORY
CREDITS	3T+2P
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

UNIT – I

Organic Photochemistry

8 h

Organic photochemistry: 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, influence of temperature, solvent, nature of hydrogen donors, structure of substrates on the course of photoreduction.

UNIT – II

Orgnaic Photochemistry

8 h

Norrish cleavages, type I: Mechanism, acyclic cyclicdiones, influence of sensitizer, photo Fries rearrangement. Norrish type II cleavage: Mechanism and stereochemistry, type II reactions of esters: 1: 2 diketones, photo decarboxylation, Di - π methane rearrangement.

UNIT – III

Protecting Groups and Organic Reactions

9 h

Principles of (1) Protection of alcohols – ether formation including silyl ethers – ester formation, (2) Protection of diols – acetal, ketal and carbonate formation, (3) Protection of carboxylic acids – ester formation, benzyl and t-butyl esters, (4) Protection of amines – acetylation, benzylation (5) protection of carbonyl groups – acetal and ketal formation.

UNIT- IV

8 h

Synthetic reactions: Mannich reaction – Mannich bases – Robinson annulations. The Shapiro reaction, Stork–enamine reaction. Use of dithioacetals – Umpolung, Phase transfer catalysis - Wittig reaction.

UNIT -V:

New Synthetic Reactions

12 h

Baylis–Hillman reaction, Mukayama aldol reaction, Heck reaction, Suzuki coupling, Stille coupling, Sonogashira coupling, Buchwald–Hartwig coupling, Ugi reaction, Click reaction.

REFERENCE 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.
12. Tandem Organic Reactions by Tse–Lok Ho.

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepQEC&printsec=copyright#v=onepage&q&f=false>

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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-C-2 : ADVANCED ORGANIC REACTION

BLUE PRINT

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S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions
01	I	1+1	1+1
02	II	1+1	1
03	III	1+1	1
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SIR C R REDDY COLLEGE, ELURU
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)
III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-C-2 : ADVANCED ORGANIC REACTION

Time:3Hrs

Maximum Marks:75

Pass Minimum: 26

SECTION - A

Answer any FIVE of the following.

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SECTION – B

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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-C-3 : PHARMACEUTICAL AND MEDICINAL CHEMISTRY

45hrs (3 h/w)

COURSE TITLE	MAJOR CORE 1 PHARMACEUTICAL AND MEDICINAL CHEMISTRY
TOTAL HOURS	45 Hrs
HOURS/WEEK	3T+2P
COURSE CODE	CHE-1A
COURSE TYPE	THEORY
CREDITS	3T+2P
MARKS	75
PROGRAM CODE	5101UMPC 5503UBZC 1830UFZC 1728UMCCS

UNIT-I

8 h

Pharmaceutical chemistry Terminology: Pharmacy, Pharmacology, Pharmacophore, Pharmacodynamics, Pharmacokinetics (ADME, Receptors - brief treatment) Metabolites and Antimetabolites.

UNIT-II

Drugs:

8 h

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:

12 h

a. Chemotherapeutic Drugs

1. Sulphadugs (Sulphamethoxazole)
2. Antibiotics - β -Lactam Antibiotics
3. Anti malarial Drugs (chloroquine)

b. Psycho therapeutic Drugs:

1. Anti pyretics (Paracetamol) 2. Hypnotics 3. Levodopa

UNIT-IV

Pharmacodynamic Drugs:

8 h

1. Antiasthma Drugs (Salbutamol)
2. Antianginals (Glycerol Trinitrate)
3. Diuretics (Furosemide)

UNIT-V

HIV-AIDS:

9 h

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

REFERENCE BOOKS

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

Web Links:

1. https://books.google.co.in/books/about/Stereochemistry_Conformation_and_Mechani.html?id=h3SwSQwsHsYC&redir_esc=y
2. <https://www.crackchemistry.in/morrison-and-boyd-organic-chemistry-7th-edition-pdf/>
3. <https://books.google.co.in/books?id=mnsKyupepQEC&printsec=copyright#v=onepage&q&f=false>

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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-C-3 : PHARMACEUTICAL AND MEDICINAL CHEMISTRY

BLUE PRINT

Kindly follow the Blue print of the syllabus strictly, while preparing the Question paper

S. No	UNIT	No. of Essay Questions	No. of Short Answer Questions
01	I	1+1	1+1
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03	III	1+1	1
04	IV	1	1+1
05	V	1+1	1

SIR C R REDDY COLLEGE, ELURU
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III B.Sc – CHMISTRY – SEMESTER-VI

PAPER – VIII-C-3 : PHARMACEUTICAL AND MEDICINAL CHEMISTRY

Time:3Hrs

Maximum Marks:75

Pass Minimum: 26

SECTION - A

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SIRC R REDDY COLLEGE ELURU, WGD
 Affiliated to Adikavi Nannaya University, Rajamahendravaram
 DEPARTMENT OF CHEMISTRY DEPARTMENTAL
 ACTION PLAN 2017-2018

SNo	Month	Week	Name of the Activity	Title of the Activity	Resource Person
1	August	4th Week	Guest Lecture	Awareness on Drugs Usage	Sri. V Vijaya Shekhar, Assistant, Drug Controller Administration Director, Eluru
2	October	1st Week	National Workshop	Space Dynamics	Sri. R. Ponginan, Deputy Director, ISRO SDSC-SHAR & R. Tatayyababu, Scientist, SG, SDSC-SHAR
3	December	1st Week	Guest Lecture	Day Today Applications on Nano Science And Technology	Dr. K. Ramachandrarao, Assistant Professor, Govt. Arts College, Rajamahendravaram
4	February	2nd Week	International Conference	Materials For Energy And Environmental Protection	Prof. Mahendra, K. Sunkara & Prof. Jacek Jasinski, Theme Leaders, Conn Research Centre, UOFL, USA

SUGGESTED LIST OF EXAMINERS / PAPER SETTERS IN CHEMISTRY
Guntur

- | | |
|------------------------|--------------------------|
| 1. Dr. P. Sridhar Babu | JKC College (Autonomous) |
| 2. Dr. M. Gowrisankar | JKC College (Autonomous) |
| 3. D. Rahul | JKC College (Autonomous) |
| 4. K. Anitha | JKC College (Autonomous) |

Bhimavaram

- | | |
|----------------------------|----------------------------|
| 1. Dr. K. Bhaskara Rao | D N R College (Autonomous) |
| 2. Dr. N. Vijaya kumar | D N R College (Autonomous) |
| 3. A. V. R. Gajapathi Raju | D N R College (Autonomous) |
| 4. V. V. Satyanarayana | D N R College (Autonomous) |

Vijayawada

- | | |
|--------------------------|------------------------------------|
| 1. Dr. K. Rayapa Reddy | ANDHRA LOYALA COLLEGE (Autonomous) |
| 2. Dr. Bala Karuna Kumar | ANDHRA LOYALA COLLEGE (Autonomous) |
| 3. Mr. K. T. S. S. Raju | ANDHRA LOYALA COLLEGE (Autonomous) |
| 4. Mrs. P. Anila | ANDHRA LOYALA COLLEGE (Autonomous) |

Narasapuram

- | | |
|----------------------|-------------------------|
| 1. Dr.S.B. Ronald | Y N College(Autonomous) |
| 2. Dr.B. Anand Kumar | Y N College(Autonomous) |
| 3. Ch.Uday kumar | Y N College(Autonomous) |
| 4. Ch.R.V.R.Prasad | Y N College(Autonomous) |