

**GOVERNMENT COLLEGE (A)
RAJAMAHENDRAVARAM**

(Accredited by NAAC "A" Grade)

UG BOARD OF STUDIES - 2019-20(2)



**DEPARTMENT OF CHEMISTRY
For the Academic Year 2019-20**

B.Sc

On 15th November, 2019

Curriculum for the Academic Year 2019-20

Proceedings of the Principal, Government College [A], Rajamahendravaram

Present: Dr.R.David Kumar Swamy, M.Sc, M.Phil., Ph.D

Rc. No: Spl./Acad.Cell-GC[A]-RJY/BOS/2018-1, Dated: 13 December 2018

Sub: - Government College [A], Rajahmundry – Boards of Studies (BoS) – Nomination of Members - Orders Issued.

Ref: - UGC Guidelines for Autonomous Guidelines 2018.

ORDER:

The Principal, Government College [A], Rajamahendravaram is pleased to constitute **Board of studies in CHEMISTRY** for framing the syllabi in Telugu subject for all semesters duly following the norms of the UGC Autonomous guidelines.

S. No	Name	Designation
1	Sri J. Yacobe, Lecturer In- Charge/HoD, Department of Chemistry, GC[A], Rajamahendravaram	Chairman
2	All Faculty members in the department	Member
3	Dr. G. V. Ramana, Lecturer in Chemistry, SKVT College, Rajamahendravaram	Subject Expert
4	Sri V. Sridhar, Lecturer in Chemistry SVRK Govt. Degree College (M), Nidadavolu.	Subject Expert
5	Dr. K. Deepthi, Assistant Professor, Dept. of Chemistry, Adikavi Nannaya University, Rajamahendravaram	University Nominee
6	Dr. S. Ramana, Chemist, ONGC, Rajamahendravaram	Expert from Industry/Corporate Sector
7	Ms.	Student Nominee

The above members are requested attend the BOS meetings and share their valuable views, suggestions on the following functionaries:

- (a) Prepare syllabi for the subject keeping in view the objectives of the college, interest of the stake holders and national requirement for consideration and approval of the Academic Council
- (b) Suggest methodologies for innovate teaching and evaluation techniques
- (c) Suggest panel of names to the Academic council for appointment of examiners
- (d) Coordinate research, teaching, extension and other activities in the department of the college.

The term of the members will be two years from the date of the nomination. The Chairman of the BoS (HoD/lecturer In-Charge of the department) is directed to coordinate with the Principal of the College and conduct BoS meetings as and when necessary, but at least once a year.



PRINCIPAL
GOVERNMENT COLLEGE [A]
RAJAHMUNDRY

Copy to:

1. The above individuals
2. File

**DEPARTMENT OF CHEMISTRY,
GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM**

Composition of the Board of Studies Committee

S.No.	Category	Designation	Name of the Chairperson & Members of Board of Studies	Remarks
1	Educational	Chairperson	Sri J. Yacobe, Lecturer in charge/HOD, Department of Chemistry, Rajamahendravaram	
2	University Nominee	Member	Smt. K. Deepthi, Asst. Professor, Department of Chemistry, Adikavi Nannaya University, Rajamahendravaram	Nominated by University
3	Industrial Nominee	Member	Dr. S. Ramana, Chemist, ONGC, Rajamahendravaram	Nominated by the Principal
4	Subject Expert	Member	Dr. G.V. Ramana, Lecturer in Chemistry, SKVT College, Rajamahendravaram	
5	Subject Expert	Member	Sri V. Sridhar, Lecturer in Chemistry, SVRK Govt. Degree College (M), Nidadavolu.	
6	Faculty	Members	All Faculty, Department of Chemistry, Rajamahendravaram	Faculty Members
7	Student	Student Nominee		Student

**Department of Chemistry,
Government Autonomous College,
Rajamahendravaram**

Board of Studies Resolutions for

Conventional Courses of

- **Mathematics, Physics & Chemistry (EM)**
- **Mathematics, Physics & Chemistry (TM)**
- **Botany, Zoology & Chemistry (EM)**
- **Botany, Zoology & Chemistry (TM)**
- **Geology, Mathematics & Chemistry (EM)**

Re-Structured Courses of

- **Micro-Biology, Zoology & Chemistry (EM)**
- **Bio-Technology, Botany & Chemistry (EM)**
- **Food Micro-Biology, Food Zoology & Food Chemistry (EM)**
- **Agricultural Bio-Technology, Agricultural Botany &
Agricultural Chemistry (EM)**
- **Mathematics, Chemistry & Analytical Chemistry**
- **Botany, Chemistry & Horticulture (EM)**
- **Zoology, Chemistry & Aquaculture (EM)**

Newly Introduced Courses

- **B.Sc. Chemistry (Honours)**

**DEPARTMENT OF CHEMISTRY,
GOVT. COLLEGE (A), RAJAMAHENDRAVARAM.
LIST OF ACTIVITIES PROPOSED FOR THE ACADEMIC YEAR
2019-20**

MONTH	ACTIVITY PROPOSED
JUNE - 2019	Departmental staff meeting to review results and class work allotment
	Submission of proposals - National Seminar on "Recent Developments in Chemical Sciences" to be conducted in February 2020.
	Preparation of curricular plans, time-tables etc.,
	Remedial coaching classes for II & III year supplementary exams
JULY - 2019	Preparations for National Seminar
	Bridge classes for I year students
	Student awareness programmes on ragging & eve teasing - consequences , self-discipline, career guidance, higher education opportunities etc.,
AUGUST 2019	6th & 9th Aug Hiroshima & Nagasaki day / 18th August - WORLD HELIUM Day / 26th Aug -Lavoisier birth day
SEPTEMBER 2019	16th-Ozone day – Guest Lecture
OCTOBER 2019	23rd MOLE Day
NOVEMBER 2019	11th National Education Day - Outreach Programme to nearby school
DECEMBER 2019	1st World AIDS Day
	4th Chemical disaster prevention Day
	Chem. Fest-2019 (Group Discussions, Quiz competitions, Poster Presentation)
JANUARY 2020	10 days coaching for PG entrance examinations in chemistry
FEBRUARY 2020	National Level Seminar on Recent Developments in Chemical Sciences
	28th - NATIONAL SCIENCE DAY

**DEPARTMENT OF CHEMISTRY, GOVERNMENT COLLEGE (A),
RAJAMAHENDRAVARAM.**

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5	I B.Sc. II Semester, Practical – II Syllabus and Scheme of Valuation.
6	II B.Sc. IV Semester, Paper – IV Syllabus, Model Question Paper, Scheme of Valuation & Blue Print
7	II B.Sc. IV Semester Practical - IV Syllabus and Scheme of Valuation.
8	III B.Sc. VI Semester, Paper – VII A,B,C Syllabus, Scheme of Valuation, Model Question Paper & Blue Print for Paper-V
9	III B.Sc. VI Semester Practical - VII Syllabus and Scheme of Valuation.
10	III B.Sc. VI Semester Paper – VIII A1, A2, A3 Syllabus, Model Question Paper, Scheme of Valuation & Blue Print.
11	III B.Sc. VI Semester Paper – VIII B1, B2, B3 Syllabus, Model Question Paper, Scheme of Valuation & Blue Print.
12	III B.Sc. VI Semester Paper – VIII C1, C2, C3 Syllabus, Model Question Paper, Scheme of Valuation & Blue Print.
13	III B.Sc. VI Semester Paper – VIII D1,D2,D3 Syllabus, Model Question Paper, Scheme of Valuation & Blue Print
14	III B.Sc. VI Semester Paper – VIII E1,E2,E3 Syllabus, Model Question Paper, Scheme of Valuation & Blue Print for Paper-VI
15	III B.Sc. V Semester Practicals Syllabus and Scheme of Valuation for Practical-VIII A1,A2,A3/B1,B2,B3/C1,C2,C3/D1,D2,D3/E1,E2,E3
16	I B.Sc.(MCAC) II Semester, Paper –II Syllabus, Model Question Paper, Scheme of Valuation & Blue Print
17	I B.Sc. (MCAC) II Semester, Practical- II Syllabus and Scheme of Valuation.
18	II B.Sc. (MCAC) IV Semester, Paper - IV Syllabus, Model Question Paper, Scheme of Valuation & Blue Print
19	II B.Sc. IV Semester Practical - IV Syllabus and Scheme of Valuation.
20	I B.Sc. Chemistry (Honours) II Semester, Paper-IIA Syllabus, Model Question Paper, Scheme of Valuation & Blue Print.
21	I B.Sc. Chemistry (Honours) II Semester, Practical-IIA Syllabus and Scheme of Valuation.
22	I B.Sc. Chemistry (Honours) II Semester, Paper-IIB Syllabus, Scheme of Valuation Model Question Paper & Blue Print.
23	I B.Sc. Chemistry (Honours) II Semester, Practical-IIB Syllabus and Scheme of Valuation.
24	II B.Sc. IV Semester, Environmental Studies Syllabus, Model Question, Scheme of Valuation Paper & Blue Print
25	Recommended Text Books and Reference Books

AGENDA

- 1. New syllabus for the Semesters II, IV, VI.**
- 2. Model Question Papers**
- 3. Blue Prints**
- 4. Additional Inputs in the Curriculum.**
- 5. Internal Assessment Component.**
- 6. Other Academic Activities of the department.**
- 7. Any other proposal with the permission of the chair.**

DEPARTMENT OF CHEMISTRY, GOVT. COLLEGE (A), RAJAHMUNDRY.

Minutes of the Board of Studies Meeting November-2019.

DATE: 15-11-2019

TIME: 2 PM

The Board of studies meeting of Chemistry Department is convened on 15-11-2019 at 2 PM under the Chairmanship of Sri J. Yacobe, in-charge of the department. The members present discussed various aspects such as changes made in the syllabus and Model Question papers of 2, 4, 6 semesters both for theory and practical for implementing them during the academic year 2019-2020 onwards.

RESOLUTIONS:

It is resolved to

- 1** Introduce and implement **B.Sc Chemistry (Honours)** new course and to design Syllabus for the said courses as per CBC System for I year B.Sc., II Semester from the Academic Year 2019-20.
- 2** Prescribe Syllabus for **MCAC (Mathematics, Chemistry and Analytical Chemistry)** course as per CBC System for II year B.Sc., IV Semester from the Academic Year 2019-20.
- 3** Prescribe Syllabus for **B.Sc., FMZC and B.Sc., Ag. BBC** courses **syllabus for Cluster Elective Papers** in VI semester from the Academic Year **2019-20**
- 4** Implementing **Research Based Pedagogical evaluation methods** in the curriculum for internal assessment
- 5** Implementing Certificate course on **Basic Analytical Techniques** from this Calendar year 2019.
- 6** It is resolved continue the inclusion of “**International Property Rights**” in the VI semester in General Elective Papers with no credits as approved in Academic Council Meeting 12th May 2018
- 7** It is resolved to continue “**Swayam Online Courses**” and a credit will be given for those courses.
- 8** It is resolved to include “**Soft Skill Programme**” to the final year students from this Academic Year 2019-20
- 9** As per the CBCS the core subject CHEMISTRY comprises of SIX courses in chemistry like six semesters as per previous practice.
 - For B.Sc. first year there will be CORE I in semester -I and Core II in semester -II
 - For B.Sc. second year there will be CORE III in semester -III and Core IV in semester -IV
 - For B.Sc. third year there will be CORE V in semester -V and Core VI in semester -VI.

10. EVALUATION: Evaluation for each course will be done as follows:

For First Year:

It has been decided to introduce Continuous Internal assessment marks for a total of **50 marks from the academic year 2019-20**, which are to be distributed as follows:

<i>S.No.</i>	<i>Component</i>	<i>Distributio n of Marks</i>
1	<i>CIE I (after completion of 50% of syllabus)</i>	20
2	<i>CIE II (Online Exam)</i>	10
3	<i>ATTENDANCE</i>	<i>Above 95%</i> 5
		<i>91% to 95%</i> 4
		<i>86% to 90%</i> 3
		<i>81% to 85%</i> 2
		<i>75% to 80%</i> 1
		<i>Below 75%</i> 0
<i>Pedagogical Strategies</i>		
4	<i>ASSIGNMENT</i>	5
5	<i>Participation or Paper Presentation in Student Seminars/Workshops/Group Discussions/ Quiz/ Student Study Project/Field Visit/Survey</i>	5
6	<i>Viva-voce</i>	5
TOTAL		50

The minimum pass mark for both internal and external examinations is 18 marks (36%), but as a whole student is subjected to get 40% marks (40 out of total 100 marks) to pass the subject.

For Second & Third Years:

For Second year students from 2017-18 academic year and for Third year students from 2018-19 academic year onwards the following Evaluation pattern is followed.

- a) **A continuous internal assessment (CIA) (for 40 marks)** by the concerned Course teacher as well as by an end semester examination (for 60 marks) and will consolidated at the end of the course for 100 marks. The components for continuous internal assessment are:

Passing minimum for end semester exam will be 40% out of 60 marks (i.e.24 Marks)

Average of two	25 Marks	1½ Hours	The passing minimum CIA will be 40% (IE., 16 marks)
Assignments	5 Marks		
Attendance /student Seminars	5 Marks		
Viva	5 Marks		
Total	40 Marks		

(b) Semester end exam at the end of each semester: Passing minimum for end semester exam will be 40% out of 60 marks (i.e. 24 marks)

11. The pattern of question papers

The pattern of question papers of II semester end examinations of Paper -II is as follows

CORE I SEMESTER -II Paper – II

(For B.Sc. course)

- a. MODULE-I INTRODUCTORY GENERAL CHEMISTRY
- b. MODULE-II INTRODUCTORY PHYSICAL CHEMISTRY

CORE II SEMESTER -II Paper –II

(For B.Sc. MCAC Course)

- a. MODULE-I BASIC CONCEPTS & ANALYTICAL METHODS - I
- b. MODULE-II ANALYTICAL METHODS - II

CORE II SEMESTER -II Paper –II A

(For B.Sc. Chemistry Honours Course)

- a. MODULE- I& II ORGANIC CHEMISTRY - IIA

CORE II SEMESTER -II Paper –II B

(For B.Sc. Chemistry Honours Course)

- a. MODULE- I& II PHYSICAL CHEMISTRY – II B

The pattern of question papers of III semester end examinations of Paper -III is as follows:

CORE III SEMESTER -III PAPER – III

(For B.Sc. course)

- a. MODULE-I SPECTROSCOPY
- b. MODULE-II APPLIED PHYSICAL CHEMISTRY

CORE III SEMESTER -III PAPER – III

(For B.Sc. MCAC course)

- a. MODULE-I SEPARATION METHODS-II

The pattern of question papers of VI semester end examinations of Paper -VII is as follows

CORE VI SEMESTER –VI PAPER – VII

(For B.Sc. course)

- VII A MODULE-I ANALYTICAL METHODS IN CHEMISTRY
- VII B MODULE-II ENVIRONMENTAL CHEMISTRY
- VII C MODULE-II GREEN CHEMISTRY

The pattern of question papers of VI semester end examinations of Paper -VIII is as follows

CORE VI SEMESTER –VI PAPER – VIIIA

(For B.Sc. course)

- VIII A1 MODULE-I POLYMER CHEMISTRY
- VIII A2 MODULE-II INSTRUMENTAL METHODS OF ANALYSIS
- VIII A3 MODULE-III ANALYSIS OF DRUGS, FOOD PRODUCTS & BIO-CHEMICAL ANALYSIS

CORE VI SEMESTER –VI PAPER – VIIIB

(For B.Sc. course)

- VIII B1 MODULE-I FUEL CHEMISTRY & BATTERIES
- VIII B2 MODULE-II INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE
- VIII B3 MODULE-III ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS

CORE VI SEMESTER –VI PAPER – VIIIC

(For B.Sc. course)

- VIII C1 MODULE-I ORGANIC SPECTROSCOPIC TECHNIQUES
- VIII C2 MODULE-II ADVANCED ORGANIC REACTIONS
- VIII C3 MODULE-III PHARMACEUTICAL & MEDICINAL CHEMISTRY

CORE VI SEMESTER –VI PAPER – VIII D

(For B.Sc. course)

VIII D1	MODULE-I	SOILS AND FERTILISERS
VIII D2	MODULE-II	PEST MANAGEMENT
VIII D3	MODULE-III	AGRICULTURAL CHEMISTRY

CORE VI SEMESTER –VI PAPER – VIII E

(For B.Sc. course)

VIII E1	MODULE-I	FOOD ADDITIVES AND ANALYTICAL TECHNIQUES
VIII E2	MODULE-II	CHEMICAL ASPECTS IN FOOD QUALITY AND PACKAGING
VIII E3	MODULE-III	FOOD ADULTERATION AND FOOD ANALYSIS

For First Year for All Papers:

- in section 'A' the candidate has to answer four essay questions from a total of **eight** questions with internal choice Marks: $4 \times 7 = 28$
- In section 'B' the candidate has to answer four short answer type questions out of Eight Questions Marks: $4 \times 4 = 16$
-
- In section 'C' the candidate has to answer all the three very short answer type questions. Marks: $3 \times 2 = 6$
- Total Marks: $28 + 16 + 06 = 50$ Marks

For Second and Third Years for All Papers:

- In section 'A' the candidate has to answer four essay questions from a total of **eight** questions with internal choice Marks: $4 \times 8 = 32$
- In section 'B' the candidate has to answer five short answer type questions out of Eight Questions Marks: $5 \times 4 = 20$
- In section 'C' the candidate has to answer all the four very short answer type questions. Marks: $4 \times 2 = 8$
- Total Marks: $32 + 20 + 08 = 60$ Marks

- 12** As per the request from student nominees, for the benefit of students facing entrance examinations of other universities and other competitive examinations, it is resolved to include Value addition / additional inputs to the syllabus prescribed by AKNU to B.Sc. I, II & III year and to modify the syllabus as per need by utilizing academic autonomy.

- 13** For First, Second and Third Years the Internal Practical Examination, will be conducted at the end of I, III and V semesters for 50 marks and External Practical Examination for I, II and III Years will be conducted at the end of II, IV and VI semesters for 50 marks respectively for those academic years.
- 12** For B.Sc. first year students admitted in 2019-20 onwards the practical syllabus is Qualitative Analysis, and for B.Sc. second year student's spectroscopy and physical chemistry practicals and for third year Organic functional group analysis and physical chemistry practicals will be implemented.

Chairman,
Board of Studies,
Department of Chemistry.

DEPARTMENT OF CHEMISTRY
GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM
TABLE SHOWING ALLOCATION OF CREDITS (FOR THEORY & PRACTICAL)

S.No	Semester	Title of the Course	Hrs/Week	Max. Marks	Marks In Cia	Credits
I B.Sc. SEMESTER - II						
1	II Paper-II	Module: General Chemistry Module: Physical Chemistry	04	100	50	03
2	Practical -II	Practical: Qualitative Analysis of Mixture Salt	03	50	-	02
I B.Sc. (MCAC) SEMESTER - II						
1	II Paper-II	Module: Quantitative Methods of Analysis	04	100	50	03
2	Practical - II	Practical: Quantitative Analysis	03	50	-	02
I B.Sc. (CHEMISTRY HONOURS) SEMESTER - II						
1	II Paper-III A	Module: Organic Chemistry - II	04	100	50	03
2	Practical - III A	Practical: Organic Chemistry	03	50	-	02
1	II Paper-III B	Module: Physical Chemistry - II	04	100	50	03
2	Practical - III B	Practical: Physical Chemistry	03	50	-	02
II B.Sc. SEMESTER - IV						
3	IV	Paper IV: Spectroscopy & Physical Chemistry	04	100	40	03
4	IV	Practical: Qualitative Analysis	03	50	-	02
II B.Sc. (MCAC) SEMESTER - IV						
	II Paper-II	Module: Separation Methods - II	04	100	50	03
	Practical - II	Practical: Separation Techniques	03	50	-	02
III B.Sc. SEMESTER - VI						
5	VI	VII-A: Analytical Methods In Chemistry	03	100	40	03
6	VI	Practical: Lab Course – VII A	03	50	-	02
7	VI	VII-B: Environmental Chemistry	03	100	40	03
8	VI	Practical: Lab Course – VII B	03	50	-	02
9	VI	VII-C: Green Chemistry	03	100	40	03

10	VI	Practical: Lab Course – VII C	03	50	-	02
11	VI	VIII-A1: Polymer Chemistry	03	100	40	03
12		Practical: Lab Course – VIII A1	03	50	-	02
13	VI	VIII -A2: Instrumental Methods of Analysis	03	100	40	03
14	VI	Practical: Lab Course – VIII A2	03	50	-	02
15	VI	VIII -A3: Analysis of Drugs, Food Products & Biochemical Analysis	03	100	40	03
16	VI	Project Work	03	50	-	02
17	VI	VIII -B1: Fuel Chemistry & Batteries	03	100	40	03
18	VI	Practical: Lab Course – VIII B1	03	50	-	02
19	VI	VIII -B2: Inorganic Materials of Industrial Importance	03	100	40	03
20	VI	Practical: Lab Course – VIII B2	03	50	-	02
21	VI	VIII -B3: Analysis of Industrial Products	03	100	40	03
22	VI	Project Work	03	50	-	02
23	VI	VIII -C1: Organic Spectroscopic Techniques	03	100	40	03
24	VI	Practical: Lab Course – VIII C1	03	50	-	02
25	VI	VIII -C2: Advanced Organic Reactions	03	100	40	03
26		Practical: Lab Course – VIII C2	03	50	-	02
27	VI	VIII-C3: Pharmaceutical & Medicinal Chemistry	03	100	40	03
28	VI	Project Work	03	50	-	02
29	VI	VIII -D1: Soils and Fertilizers	03	100	40	03
30	VI	Practical: Lab Course – VIII D1	03	50	-	02
31	VI	VIII -D2: Pest Management	03	100	40	03
32	VI	Practical: Lab Course – VIII D2	03	50	-	02
33	VI	VIII-D3: Agricultural Chemistry	03	100	40	03
34	VI	Project Work	03	50	-	02
35	VI	VIII -E1: Food Additives and Analytical Techniques	03	100	40	03
36	VI	Practical: Lab Course – VIII E1	03	50	-	02
37	VI	VIII -E2: Chemical Aspects Food Quality & Packaging	03	100	40	03
38	VI	Practical: Lab Course – VIII E2	03	50	-	02
39	VI	VIII-E3: Food Adulteration and Food Analysis	03	100	40	03
40	VI	Project Work	03	50	-	02

ADDITIONS AND DELETIONS FOR THE ACADEMIC YEAR 2019-20

Aim: In order to prepare the students for attending various competitive exams and for M.Sc. Entrance tests of different Universities. To enrich the students in the path of application oriented learning.

I B.Sc. CHEMISTRY PAPER-I

SEMESTER I					
S.No	Topic deleted	No. of hours	Topic incorporated	No. of hours	Justification
1	-	-	Theory of Qualitative Analysis	04 Hours	To have thorough knowledge on what is happening in practicals

II B.Sc. CHEMISTRY PAPER-III

SEMESTER III					
S.No	Topic deleted	No. of hours	Topic incorporated	No. of hours	Justification
1	-	-	Nucleophilic substitution reactivity of various halogen compounds, Hammett's rule, Nucleophilic substitution reactivity of various halogen compounds. Hoffmann Bromide Degradation	04 Hours	To have thorough for attending various competitive exams and for M.Sc. Entrance tests of different Universities

III B.Sc. CHEMISTRY PAPER-V

SEMESTER V					
S.No	Topic deleted	No. of hours	Topic incorporated	No. of hours	Justification
1	Molecular Spectroscopy	05 Hours	Material Science	05 Hours	The deleted Topic was repeated in V Sem. To have knowledge on Nano Materials

JUSTIFICATION FOR THE INTRODUCTION OF VARIOUS COURSES IN OUR CURRICULUM:

OBJECTIVES OF THE CONVENTIONAL B.Sc CHEMISTRY COURSES:

We can hardly find any industry without the need of Chemists. Students with B.Sc. Chemistry are much sought after by the industry. This paper offers in depth knowledge

in chemistry to students and surely enhances the skills and thereby improves their future job/academic prospects. Therefore it is resolved to introduce Chemistry paper in B.Sc., course. Besides classical analysis, instrumental analysis is covered in the syllabus. Quantitative and mainly qualitative analytical techniques are discussed in detail.

OUTCOMES OF THE CONVENTIONAL B.Sc CHEMISTRY COURSES: The students have wide range of Job Oriented opportunities as Quality Control Analyst, Quality Assurance, Research and Development, Process Managers, Project Manager, Analytical Chemists etc.

OBJECTIVES OF THE JOB ORIENTED B.Sc FMZC, Ag. BBC COURSES: The Food MZC course is beneficial to provide professionals courses with knowledge about the development, Preservation, processing, packaging, distribution and usage of safe, nutritive and healthy foods. Agricultural BBC course provides depth knowledge and practical skills to students regarding suitable fertilizer for the land, pest management, food preparation, entrepreneurship and food manufacturing and baking industries. Self-employment opportunities also exist in the form of dynamic delivery networks for those who want to work on their own.

OUTCOMES OF THE JOB ORIENTED B.Sc FMZC, Ag. BBC COURSES: After graduating in B.Sc FMZC & Ag. BBC courses the students have wide range of Job Oriented opportunities as Production Managers, Procuring Manager, Marketing sectors, Food Microbiologist, Food Standards Officer and Food Technologist.

OBJECTIVES OF THE RESTRUCTURED B.Sc. MCAC COURSE:

Analytical Chemistry is an applied, experimental field of science and is based not only on chemistry, but also on physics, biology, information theory and many fields of technology. It is of fundamental importance not only to all branches of chemistry but also to all biological sciences, engineering sciences, health, medicine, pharmaceuticals, environment, industrial processes, quality control and implementation of legislation.

The objective of B.Sc Analytical chemistry course is to provide students exposure to chemistry, physics, biological sciences, environmental science, computer application, instrumentation and analytical techniques. In this three year course spread over six semesters, there are 10 papers of Analytical chemistry 7 papers of chemistry and 7 Mathematics. In the last semester of this course, there is a provision for one cluster elective papers out of two cluster elective papers, viz.

OUTCOMES OF THE RESTRUCTURED B.Sc. MCAC COURSE: After graduating in Analytical Chemistry the students can pursue academics in Chemistry, bioinformatics, forensic science, biochemistry and other disciplines of interdisciplinary sciences. They can also use it as a stepping stone to pharmaceutical industry and for Research and Development in industry.

OBJECTIVES OF THE B.Sc. CHEMISTRY (HONOURS) COURSE:

It is of fundamental importance to all branches of chemistry dealing with pharmaceuticals, IT skills, Cosmetics & Perfumes, Environmental Protection, Pesticides etc. In this three year course spread over six semesters, there are 14 Core course papers and 8 Elective Papers of chemistry and 4 Mathematics papers.

OUTCOMES OF THE B.Sc. CHEMISTRY (HONOURS) COURSE:

After graduating in B.Sc. Chemistry (Honours) Course the students can pursue academics in Chemistry, Research, bioinformatics, Cosmetic science, Environmental Management System and other disciplines of interdisciplinary sciences. They can also use it as a stepping stone to pharmaceutical industry and for Research and Development in industry.

OBJECTIVES & OUTCOMES OF THE CERTIFICATE COURSE: This course will impart immense skills on qualitative and quantitative analysis in chemistry to both science and non-science students. The main objective of this course is to provide training to the candidates to work as technicians in chemistry labs in junior, degree and PG colleges and pharmaceutical laboratories.

S.No.	Name	Signature
1.	Dr. K. Deepthi, University Nominee Adi Kavi Nannaya University, Rajahmundry.	
2.	Dr. S. Ramana, Industrial Nominee Chemist, ONGC, Rajahmundry.	
3.	Dr. G.V. Ramana, Local Nominee, S.K.V.T. Degree College, Rajahmundry.	
4.	Sri V. Sridhar, Subject Expert, SVRK GDC (M), Nidadavole	
5.	Dr. B. Madhav, Staff Member	
6.	Dr. B. Mallikarjuna, Staff Member	
7.	Dr. (Smt). K. Anitha, Staff Member	
8.	Dr. K. Raveendra Babu, Staff Member	
9.	Smt. J. Sasi Sree, Staff Member	
10.	Dr. E.S.R.S. Sharma, Staff Member	
11.	Sri B.S.V. Prasad, Staff Member	
12.	Smt. M. Usha Rani, Staff Member	
13.	Smt. N. Bhargavi, Staff Member	
14.	Smt. P. Surya Sree, Staff Member	
15.	Sri. K. Srinivasa Rao, Staff Member	
16.	Smt. B. Baby Nalini, Staff Member	
17.	Kum. B. Maha Lakshmi, Staff Member	
18.	Sri U. Suri Babu, Staff Member	

19.	Sri I. Ramesh, Staff Member	
20.	Sri G. Durga Prasad, Staff Member	
21.	Sri S.V.V.S. Durga Prasad	
22.	Sri K. Ramesh, Staff Member	
23.		
24.		
25.		
26.		
27.		
28.		

The following members attended the Board of studies meeting:

The following documents submitted to the Academic coordinator and
Controller of Examinations:

1. Resolutions of Board of Studies Meeting
2. Syllabus of II, IV, and VI semesters.
3. Model question papers for II, IV, and VI semesters
4. List of revised Examiners (if any)
5. Any other new proposals

Date: 15-11-2019

Chairman,
Board of Studies,
Department of Chemistry.

List of Examiners and Paper Setters:

S. No.	Name of the Lecturer/Reader	College	Paper Taught
01	K. Sarveswara Rao	GDC Kothapeta	All
02	V.V. Prabhakara Rao	GDC, Dumpagadapa (W.G. Dt.)	All
03	V. Soma Sekhara Rao	GDC, Alamuru	All
04	Dr. V. Sambasiva Rao	GDC, TUNI.	All
05	A. Sai Sundar	Govt. College, Jangareddigudem	All
06	Dr. T. Narasimha murthy	GDC, Mandapeta	All
07	U. Venkatacharyulu	Govt. College, Jaggampeta	All
08	Ms. V. Ananta Lakshmi	ASD GDC(W), Kakinada	All
09	T.V.V. Satyanarayana	GDC, Ramachandrapuram	All
10	T. Sreevaram	GDC, Ravulapalem	All
11	D. Suneetha	GDC, Yeleswaram	All
12	V. Badrinarayana Rao	GDC.(W) Kakinada	All
13	E.V.S Subrahmanyam	GDC, Razole	All
14	M.M. Pacha	GDC, Ramachandrapuram	All
15	R. Brahmaji	GDC, Ramachandrapuram	All
16	U. Satyanarayana	GDC, Tuni	All
17	T. Vara Prasad	P.R.G. C.(A) Kakinada	All
18	D. Ramarao	P.R.G. C.(A) Kakinada	All

19	K. Anand	GDC, Chinthalapudi	All
20	V. Mallikrajuna Sharma	P.R.G.C, Kakinada	All
21	G. Srinivasa Reddy	DCR College, G.Mamidada	All
24	D. Chenna Rao	ASD GDC(W), Kakinada	All
25	T. Srinivasa Rao	GDC (M), Nidadavolu	All
26	V. Sridhar	GDC (M), Nidadavolu	All
27	M. V. Prem Sagar	GDC (M), Nidadavolu	All
29	DSN. Raju	---Do--	All
30	A. Venkata Rao	GDC, Ramachandrapuram	All
31	T. Nageswara Rao	K.G.R.L., Bhimavaram	All
33	B. Rama Krishna	SKST(W)DC, Tanuku	All
34	Dr. G. V. Ramana	SKVT C, Rajahmundry	All
35	P. Siva Kumar	GDC, Mandapeta	All
	University Nominee	Local Nominee	

**Chairman,
Board of Studies,
Department of Chemistry.**

Government College (A), Rajamahendravaram

(Accredited by NAAC "A" Grade)

Department of Chemistry

Certificate of Submission

These following documents are submitted to the Academic Coordinator and Controller of Examinations:

1. Hard copy of the approved curriculum which includes minutes of U.G. Board of studies, approved syllabus, blue print for the question papers and model question papers for all semesters and list of approved examiners .
2. CD containing the approved curriculum which includes minutes of U.G. Board of Studies, approved syllabus, blue print for the question papers and model question papers for all semesters and list of approved examiners.

Chairman
(J. Yacobe)

Academic Coordinator

Controller of Examinations

GOVT. COLLEGE (AUTONOMOUS), RAJAHMUNDRY
DEPARTMENT OF CHEMISTRY
SYLLABUS FOR I B.Sc., II SEMESTER
FROM 2019 -20 ONWARDS
GENERAL AND PHYSICAL CHEMISTRY

Total Hours: 60

**UNIT -I: ATOMIC STRUCTURE, ELEMENTARY QUANTUM MECHANICS
AND CHEMICAL BONDING: 15 Hours**

Atomic Structure, Elementary Quantum Mechanics: 7 Hours

Blackbody radiation, Planck's radiation law, photoelectric effect, Compton Effect, De Broglie's hypothesis, Heisenberg's uncertainty principle. Postulates of quantum mechanics. Schrödinger wave equation derivation.

Additional Input: Shapes of Orbitals.

Chemical Bonding : 8 Hours

Valence bond theory and its application to ClF_3 , BrF_5 , PCl_5 , SF_6 , XeF_2 . Dipole moment and structure of molecules. Molecular orbital theory - LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (He_2 , B_2 , C_2 , N_2 , O_2 , HCl , CO and NO). Comparison of VB and MO theories.

Additional Input: Ionic solids- lattice and solvation energy, solubility of ionic solids, Fajan's rule.

UNIT-II: STEREOCHEMISTRY OF CARBON COMPOUNDS: 15 Hours

Molecular Representations: a) Wedge, b) Fischer, c) Newman and d) Saw-Horse formulae.

Optical activity- plane polarized light, optical rotation and specific rotation.

Chiral molecules-definition and criteria (symmetry elements. Definition of enantiomers and diastereomers. Explanation of optical isomerism with molecules

Glyceraldehyde, Lactic acid, Alanine, tartaric acid and 2, 3 -dibromopentane.

D, L and R, S configuration: Cahn-Ingold-Prelog rules. Racemic mixture- racemisation and resolution techniques.

Geometrical isomerism with reference to alkenes- cis, trans and E, Z- configuration. Additional input: Optical Activity and physiological activity of Natural Products.

UNIT- III: STATES OF MATTER:**15 Hours****Gaseous State:****6 Hours**

Deviation of real gases from ideal behaviour, van der Waal's equation of state, P-V Isotherms of carbon dioxide. Critical phenomena. The van der Waal's equation and the critical state (Relationship between critical constants and Vander Waal's constants). The law of corresponding states and reduced equation of states. Joule-Thomson effect. Liquefaction of gases: i) Linde's method and ii) Claude's method.

Liquid State:**4 Hours**

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

Additional Input: Cp/Cv ratio, Numerical problems

Solid State Chemistry:**5 Hours**

Types of Solids-symmetry in crystal systems-space lattice and unit cell- Bravais Lattices crystal systems -law of rational indices-Miller indices-inter planar spacings in a crystal system-X-ray diffraction- Bragg's equation; Quasi crystals. Defects in crystals-point and line defects; Schottky and Frenkel defects.

Additional Input: Color centre.

UNIT - IV: SOLUTIONS AND SURFACE CHEMISTRY:**15 Hours****Solutions****9 Hours**

Solutions of liquids in liquids - Raoult's law- ideal solutions, non-ideal solutions. Vapour pressure - composition curves for ideal and non-ideal solutions. Vapour pressure - composition and temperature-composition curves of completely miscible binary solutions (Azeotropes-HCl-H₂O, ethanol-water systems) - fractional distillation. Partially miscible liquids-phenol-water, tri methyl amine-water, nicotine-water systems. Effect of impurity on consolute temperature. Steam distillation. Nernst distribution law and its applications. Solutions of gases in liquids- Henry's law.

Additional Input: Types of Solutions

Surface Chemistry:**6 Hours**

Definition of colloids. Solids in liquids (sols), preparation, 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

Additional Input: Factors effecting adsorption.

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.

B.Sc. FIRST YEAR CHEMISTRY, II SEMESTER

BLUE PRINT FROM 2019-20 ONWARDS

GENERAL AND PHYSICAL CHEMISTRY

S.No.	Chapter	Essay questions (07 M) knowledge	Short answer questions (04 M) understanding	Very short answer questions (02 M) skill /application
1	UNIT -I: ATOMIC STRUCTURE, ELEMENTARY QUANTUM MECHANICS AND CHEMICAL BONDING	02	02	01
2	UNIT-II: STEREOCHEMISTRY OF CARBON COMPOUNDS	02	02	01
3	UNIT- III: STATES OF MATTER	02	02	01
4	UNIT - IV: SOLUTIONS AND SURFACE CHEMISTRY	02	02	-
Total Number of Questions		08	08	03

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
B.Sc. FIRST YEAR CHEMISTRY, II SEMESTER
MODEL QUESTION PAPER FROM 2019-20 ONWARDS

GENERAL AND PHYSICAL CHEMISTRY

Time: 2½ Hours

Total Marks: 50

PART -A

Note: Answer All the Questions.

4x7 = 28 Marks

గమనిక: అన్ని ప్రశ్నలకి సమాధానములిమ్ము.

1. Derive Schrodinger's wave equation.

శ్రోడింగర్ తరంగ సమీకరణం ఉత్పాదించుము

OR / లేదా

What is LCAO method? Explain the molecular orbital diagrams of molecules .a) O₂ b) CO

LCAO పద్ధతి అనగానేమి ? ఈక్రింది అణువుల అణు ఆర్బిటాల్ చిత్రాలను వివరించుము. a) O₂ b) CO
అణువుల అణు ఆర్బిటాల్ చిత్రాణువుల

2. What are enantiomers and diastereomers? Explain optical isomerism with
Glyceraldehyde and Lactic acid molecules.

ఎనన్సియోమర్లు మరియు డయాస్టెరియోమర్లు అనగా నేమి? గ్లిసరాల్డిహైడ్ మరియు లాక్టిక్ ఆమ్లముల
దృక్ సాదృశ్యమును వివరించుము

OR / లేదా

What are Cahn- Ingold and Prelog (CIP) rules? Explain R, S Configuration with suitable
Examples

చాన్, ఇన్గోల్డ్ మరియు ప్రేలోగ్ నియమములేవి. R, S విన్యాసమును తగిన ఉదాహరణల తో
వివరించుము.

3. Explain the causes for deviation of real gases and derive van der Waal's equation of state.

నిజ వాయువుల విచాలనాలకు కారణములు వివరించి వాండర్ వాల్ స్థితి సమీకరణాన్ని ఉత్పాదించండి.

OR / లేదా

Discuss briefly the following. a) Raoult's law b) Henry's law c) Azeotropes d) CST

క్రింది వాటిని సంగ్రహంగా వివరించుము

a) రౌల్ట్ నియమము b) హెన్రీ నియమము c) స్థిర క్వడనాంక మిశ్రమములు d) సందిగ్ధ ద్రావణ ఉష్ణోగ్రత

4. What is colloid? Write preparation, properties (kinetic, optical, and electrical) of colloids.

కొల్లాయిడ్ అనగా నేమి? కొల్లాయిడ్ ల తయారీ, ధర్మాలు (గతిక, దృవణ, విద్యుత్) వ్రాయుము

OR / లేదా

Describe in detail different types of defects in crystals

స్పటికములలోని వివిధ రకముల లోపాలను సవివరముగా వివరించండి

PART – B

Note: Answer any Four (4) Questions

4x4 = 16 M

గమనిక: క్రింది వానిలో నాలుగు ప్రశ్నలకి సమాదానములిమ్ము.

5. Explain Heisenberg's uncertainty principle and Compton Effect.

హైసెన్ బెర్గ్ అనిశ్చితత్వ నియమము మరియు కాంప్టన్ ఫలితము వివరించుము

6. Write a note about geometrical isomerism.

జ్యామితీయ సాదృశ్యము గూర్చి లఘువ్యాఖ్య వ్రాయుము

7. What is Joule Thomson effect? Describe Claude's liquefaction process.

జౌల్ థామ్సన్ ప్రభావం అనగానేమి? క్లాడ్ ఫిషర్ వాయువుల ద్రవీకరణాన్ని వివరించండి.

8. Explain an expression for Langmuir adsorption isotherm.

లాంగ్మూర్ అదిశోషణ సమోష్ణోగ్రత రేఖకు సమీకరణాన్ని వివరించండి.

9. Compare valence bond theory and molecular orbital theory.

వేలెన్స్ బంధ సిద్ధాంతము మరియు అణు ఆర్బిటాల్ సిద్ధాంతములను పోల్చుము.

10. Write briefly about resolution?

ప్రదహకరణం గురించి వ్రాయండి

11. Derive Bragg's equation.

బ్రాగ్ సమీకరణము ఉత్పాదించుము చర్చించు.

12. Describe vapour pressure- composition curves for non-ideal solutions.

అదర్శితర ద్రావణాల బాష్పపీడన –సంఘటన వక్రాలను వివరించండి

PART-C

Note: Answer All the Questions.

3x2 = 6 Marks

గమనిక: అన్ని ప్రశ్నలకి సమాధానములిమ్ము.

13. Write the hybridization and structure of Ni (CO)₄ and ClF₃

Ni (CO)₄ మరియు and ClF₃ ల సంకరీకరణము మరియు నిర్మాణాలను వ్రాయుము

14. Define enantiomers and diastereomers with examples

ఎనాన్సిమర్ మరియు డయాస్టీరియోమర్ లను నిర్వచించి , ఉదాహరణలు వ్రాయండి

15. Define critical temperature. What is T_c value for CO₂ gas?

సందిగ్ధ ఉష్ణోగ్రతను నిర్వచించుము. CO₂ వాయువుకు T_c విలువఎంత?

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.

B.Sc. FIRST YEAR CHEMISTRY, II SEMESTER
PRACTICAL COURSE FROM 2019-20 ONWARDS

PRACTICAL PAPER-II
ANALYSIS OF MIXTURE SALT

Time: 45 Hours (3 Hrs/Wk)

SYLLABUS FOR QUALITATIVE INORGANIC ANALYSIS

Analysis of mixture salt containing two anions and cations (From two different groups) from the following:

Anions: Carbonate, Sulphate, Chloride, Bromide, Acetate, Nitrate, Borate, Phosphate, oxalate, Tartrate.

Cations: Lead, Copper, Iron, Aluminium, Zinc, Manganese, Nickel, Calcium, Strontium, Barium,
Potassium and Ammonium.

SCHEME OF VALUATION

Time: 3 Hours

Total: 50 marks

Scheme for External Examination

1) Record: 10 Marks

2) Practical: 40 Marks

Systematic Procedure Should Be Adopted:

Breakup of marks:

Part-A: Preliminary Tests

- | | |
|--------------------------|---|
| 1. Colour And Appearance | 2 |
| 2. Solubility | 2 |
| 3. Flame Test | 2 |
| 4. Action Of Heat | 2 |

Part-B: Test for Each Anion - 4

Two Anions- $2 \times 4=8$

Breakup of 4 Marks For Each Anion

Dry Test with Acids - 2

Conformation Test with Extract - 2

Carbonate Extract Preparation 2

Elimination of Interfering Anion 3

Part-C: Test for Each Cation - 5

Two Cations 2x5=10

Breakup of 5 Marks For Each Cation

Identification of Correct Group

In Separation -1

Colour of the Precipitate -1

Group Separation -1

Conformation Test in The Group -2

For Ammonium Cation:

Dry Test with Sodium Hydroxide- 2

Conformation Test with Nessler's Reagent -3

Part -D: Report -4

For Two Cations - 2

For Two Anions - 2

Viva-voce - 5

TOTAL MARKS: 50

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM
DEPARTMENT OF CHEMISTRY
SYLLABUS FOR I B.SC., ANALYTICAL CHEMISTRY, II SEMESTER
FROM 2019 – 2020 ONWARDS

QUANTITATIVE METHODS OF ANALYSIS

Total Hours: 60

UNIT – I - GRAVIMETRIC ANALYSIS – I

15 Hours

A. Precipitation methods: Precipitation, Mechanism of Precipitation – Nucleation & Crystal Growth- Induction Period – Steps involved in formation of Pure and Complete Precipitation (only steps) – Purity of Precipitates- Co-Precipitation and Post Precipitation (only concepts) – Re-Precipitation.

B. Volatilization methods: Volatilization of analyte or its decomposition products at a suitable temperature. Collection and Weighing of the volatile product or, alternatively, the mass of the product is determined indirectly from the loss in mass of the sample.

Example: Determination of the Sodium Hydrogen Carbonates content of antacid tablets.

UNIT – II - GRAVIMETRIC ANALYSIS – II

15 Hours

Properties of Precipitates and Precipitating Reagents: Particle size, Filterability of Precipitates (factors that determine particle size, formation of precipitates and particle size) - Colloidal Precipitates (coagulation of colloids, peptization of colloids, treatment of colloidal precipitates) - Crystalline Precipitates (particle size and filterability) - Co-precipitation (surface adsorption, mixed-crystal formation, occlusion, and mechanical entrapment, co precipitation errors) - Precipitation from Homogeneous Solution (The use of the technique of homogeneous solutions to effect precipitation).

Drying and Ignition of precipitates - Introduction

Sedimentation and relative centrifugal force.

UNIT – III - VOLUMETRIC ANALYSIS

15 Hours

Definitions: Titrimetry, Volumetric Titrimetry, Gravimetric Titrimetry, Coulometric Titrimetry.

The equivalence point and the end point

Classification of volumetric methods: Theory of indicators and buffers - Equilibria

Principles - Aqueous and Non-Aqueous Acid-Base Titration - Redox Titrations -

Complexometric Titrations - Precipitation Titrations.

Sigmoidal Titration Curves for Neutralization Titrations.

UNIT – IV

INTRODUCTION TO ENVIRONMENTAL ANALYSIS

15 Hours

- A. Sampling: Methods of Gaseous, Liquid and Solid Samplings – Cone and Quarter Method
Solid Samples
- B. Environmental pollution from industrial effluents and radiochemical waste.
- C. Environmental Management System.
- D. Introduction to water and waste analysis.

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.

DEPARTMENT OF CHEMISTRY

I B.SC. ANALYTICAL CHEMISTRY II SEMESTER

BLUE PRINT FROM 2019-20 ONWARDS

PAPER-II: QUANTITATIVE METHODS OF ANALYSIS

Sl. NO.	Chapter	Essay Question (07 M) knowledge	Short Answer Question (04 M) Understanding	Very Short Answer Question (02 M) Skill / Application
1.	Gravimetric Analysis-I	01	01	--
2.	Gravimetric Analysis-II	03	02	01
3.	Volumetric Analysis	02	02	01
4.	Introduction to Environmental Analysis	02	02	01
Total no of Questions		08	08	03

GOVERNMENT COLLEGE (A), RAJAHMUNDRY.
I B.Sc. ANALYTICAL CHEMISTRY, II SEMESTER
MODEL QUESTION PAPER FROM 2019-20 ONWARDS

QUANTITATIVE METHODS OF ANALYSIS

Time: 2½ Hours

Total Marks: 50

PART - A

Note: Answer **ALL** the Questions

4 x7 =28 M

1. (A) What is Gravimetric Analysis? Explain various Precipitation methods of Gravimetric Analysis.

(OR)

(B) Explain the Titration Curves for Neutralization Titrations.

2. (A) Explain any four properties of Precipitates and Precipitation reagents.

(OR)

(B) Give a detailed account procedure for Practical Gravimetric Analysis.

3. (A) What is volumetric titrimetry? Explain the classification of Methods of Volumetric Analysis.

(OR)

(B) Define Indicator and Explain the Theories of Indicators.

4. (A) What is Centrifugation and write about different types of Centrifugation techniques.

(OR)

(B) Give a detailed account on Environmental Pollution from Industrial effluents and Radio Chemical Waste.

PART - B

Note: Answer any **Four** Questions

4x4 = 20 M

5. Write a brief note on Volatilization methods.

6. What are Colloidal Precipitates and Write about Coagulation of Colloids.

7. Write about Complexometric Titrations with one example.
8. Explain any two types of Rotors.
9. Write a short note on Analysis of Water.
10. What is Co-Precipitation and Explain the Types of Co-Precipitation.
11. Write about various Indicators used in Redox Titrations.
12. Write about the Density Gradient.

PART-C

Note: Answer **ALL** Questions

3x2 = 6M

13. Differentiate Equivalence point and end point.
14. Define Sedimentation and Give one example.
15. What is Radio Chemical Waste?

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.

I B.Sc. ANALYTICAL CHEMISTRY, II SEMESTER

PRACTICAL COURSE FROM 2019-20 ONWARDS

LABORATORY COURSE – II

QUANTITATIVE (VOLUMETRIC) ANALYSIS

45 Hours

1. Determination of the pKa and Equivalent Weight of a weak acid by Potentiometric pH titration.
2. Determination of the strength of the given magnesium Sulphate solution using EDTA and Eriochrome black -T as the indicator.
3. Determination of the capacity of an anionic exchange resin.
4. Separation of cadmium and zinc on an ion exchange resin.
5. Homogeneous precipitation of the Nickel as its Dimethylglyoxime.
6. Analysis of soil
 - i) Determination of pH of soil.
 - ii) Determination of total soluble salts.
 - iii) Determination of carbonate and bicarbonate.
 - iv) Determination of calcium, magnesium and iron.

Suggested Readings:

1. Analytical Chemistry- Methods of Separation (R.V. Dilts).
2. Laboratory Handbook of Chromatographic Methods (O. Mikes, R. A. Chalmers).
3. F.W. Fifield and D. Kealy: Analytical Chemistry.
4. Vogel's textbook of quantitative chemical analysis, 6 edition.
5. Vogel's textbook of quantitative chemical analysis, 7 edition.
6. Keith Wilson and John Walker: Practical Biochemistry.

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.

I B.Sc. ANALYTICAL CHEMISTRY, II SEMESTER

PRACTICAL COURSE FROM 2019-20 ONWARDS

LABORATORY COURSE – II

QUANTITATIVE (VOLUMETRIC) ANALYSIS

(At the end of Semester II)

Max. Marks: 50 Marks

Time: 3 Hours.

SCHEME OF VALUATION:

For Record - 10 Marks

For Practical - 40 Marks

Splitting of Practical Marks:

- i) Procedure in first 10 min. : 5 Marks
- ii) Formula with units : 5 Marks
- iii) Neat Tabulation : 5 Marks
- iv) Correct Calculation : 5 Marks

Error < 10%: 20 Marks

Error 10-15 %: 15 Marks

Error > 15 %: 10 Marks (Minimum Marks)

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM
DEPARTMENT OF CHEMISTRY
SYLLABUS FOR I B.SC.(HONOURS) CHEMISTRY, II SEMESTER
FROM 2019 – 2020 ONWARDS
PAPER – IIA : ORGANIC CHEMISTRY - I

Total Hours: 60

UNIT-I: BASICS OF ORGANIC CHEMISTRY & SATURATED HYDROCARBONS

15 Hours

BASICS OF ORGANIC CHEMISTRY:

9 Hours

Organic Compounds: Classification, and Nomenclature, Hybridization, Shapes of molecules, Influence of hybridization on bond properties.

Electronic Displacements: Inductive, electromeric, resonance and mesomeric effects, hyper conjugation and their applications; Dipole moment; Organic acids and bases; their relative strength.

Homolytic and Heterolytic fission with suitable examples. Curly arrow rules, formal charges; Electrophiles and Nucleophiles; Nucleophilicity and basicity; Types, shape and their relative stability of Carbocation's, Carbanions, Free radicals and Carbenes.

Introduction to types of organic reactions and their mechanism: Addition, Elimination and Substitution reactions.

SATURATED HYDROCARBONS:

6 Hours

A. **Carbon-Carbon sigma bonds:** Chemistry of alkanes: Formation of alkanes, Wurtz Reaction, Wurtz-Fittig Reactions, Free radical substitutions: Halogenation -relative reactivity and selectivity.

UNIT-II:CHEMISTRY OF UNSATURATED HYDROCARBONS

15 Hours

B. **Carbon-Carbon pi bonds:** Formation of alkenes and alkynes by elimination reactions, Mechanism of E1, E2, E1cb reactions. Saytzeff and Hofmann eliminations.

Reactions of alkenes: Electrophilic additions their mechanisms (Markownikoff/ Anti Markownikoff addition), mechanism of oxymercuration-demercuration, hydroboration-oxidation, Ozonolysis, reduction (catalytic and chemical), Syn and anti-hydroxylation (oxidation). 1,2-and 1,4-addition reactions in conjugated dienes and, Diels-Alder reaction; Allylic and benzylic Bromination and mechanism, e.g. propene, 1-butene, toluene, ethyl benzene.

Reactions of alkynes: Acidity, Electrophilic and Nucleophilic additions. Hydration to form carbonyl compounds, Alkylation of terminal alkynes.

UNIT: III STEREOCHEMISTRY:

15 Hours

Geometrical isomerism: cis-trans and, Syn-anti isomerism E/Z notations with C.I.P rules.

Optical Isomerism: Optical Activity, Specific Rotation, Chirality/Asymmetry, Enantiomers, Molecules with two or more chiral-centres, Distereoisomers, meso structures, racemic mixture and resolution. Relative and absolute configuration: D/L and R/S designations.

UNIT:IV CHEMISTRY OF ACYCLIC AND AROMATIC HYDROCARBONS: 15Hours

CYCLOALKANES AND CONFORMATIONAL ANALYSIS:

6 Hours

Types of cycloalkanes and their relative stability, Baeyer strain theory, Conformation analysis of alkanes: Relative stability: Energy diagrams of cyclohexane: Chair, Boat and Twist boat forms; Relative stability with energy diagrams.

3. Chemistry of Aromatic Hydrocarbons:

9 Hours

Aromaticity: Huckel's rule, aromatic character of arenes, cyclic carbocation's/carbanions and heterocyclic compounds with suitable examples. Electrophilic aromatic substitution: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their mechanism. Directing effects of the groups.

Reference Books:

1. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
4. Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds; Wiley: London, 1994.
5. Kalsi, P. S. Stereochemistry Conformation and Mechanism; New Age International, 2005.

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DEPARTMENT OF CHEMISTRY

I B.SC.(HONOURS) CHEMISTRY II SEMESTER

BLUE PRINT FROM 2019-20 ONWARDS

PAPER-IIA: ORGANIC CHEMISTRY

Sl. NO.	Chapter	Essay Question (07 M) knowledge	Short Answer Question (04 M) Under standing	Very Short Answer Question (02 M) Skill / Application
1.	UNIT-I: BASICS OF ORGANIC CHEMISTRY & SATURATED HYDROCARBONS	02	02	--
2.	UNIT-II: CHEMISTRY OF UNSATURATED HYDROCARBONS	02	02	01
3.	UNIT : III STEREO CHEMISTRY	02	02	01
4.	UNIT:IV CHEMISTRY OF ACYCLIC AND AROMATIC HYDROCARBONS	02	02	01
Total no of Questions		08	08	03

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DEPARTMENT OF CHEMISTRY

I B.SC.(HONOURS) CHEMISTRY II SEMESTER

MODEL QUESTION PAPER FROM 2019-20 ONWARDS

PAPER-IIA: ORGANIC CHEMISTRY-I

SECTION - A

Time: 2 ½ hrs

Marks: 50 M

Answer all Questions

4 X 7 = 28 M

- 1) Describe different types of organic reactions with suitable examples.

(or)

What is Inductive effect? How it explain the acidity of different carboxylic acids and basicity of amines.

- 2) Describe different types of Elimination reactions (E_1 , E_2 , E_{1cb}) with mechanism.

(or)

a) Write the classification of Dienes. Write a note on 1,2 and 1,4 addition reaction in conjugated Dienes.

b) Diels – Alder reaction.

- 3) Explain Geometrical and Optical Isomerism.

(or)

Explain Racemic mixture and Resolution.

- 4) Write any two methods of preparation of Cycloalkanes and explain Bayer's strain theory.

(or)

Explain the mechanism of the following reactions in Benzene ring.

a) Nitration b) Friedel-crafts alkylation c) Friedel-crafts acylation

SECTION – B

Answer any four questions.

4x4 = 16 M

- 5) What is hyper conjugation? Give one application.

6) Write wurtz and wurtz-fittig reactions

- 7) Write the reactions of alkenes with the following reagents:

a) HBr b) HBr in presence of peroxide.

8) Write about Hydroboration and Ozonolysis.

- 9) What are Enantiomers and Diastereomers? Give examples.

- 10) Write relative and absolute configuration.
- 11) Write about conformational analysis of cycloalkane and draw the energy diagram of cyclohexane
- 12) What is Aromaticity? Write the aromatic character of Arenes with suitable examples.

SECTION – C

Answer all questions.

3x2 = 6M

- 13) Define Carbenes. Give one example.
- 14) Explain acidity of Acetylenic Hydrogen.
- 15) Define ortho and para directing groups with suitable examples.

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I B.Sc. CHEMISTRY(HONOURS), II SEMESTER
PRACTICAL COURSE SYLLABUS FROM 2019-20 ONWARDS

PRACTICAL PAPER – IIA (ORGANIC CHEMISTRY)

45 Hrs. (3 H / W)

I. Organic Qualitative Analysis :

- i) Identification of an organic compound through the functional group analysis, determination of melting point/ boiling point and preparation of suitable derivatives.

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

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I B.Sc. CHEMISTRY(HONOURS), II SEMESTER
LABORATORY COURSE – IIA: ORGANIC CHEMISTRY – I

SCHEME OF VALUATION

Total – 50 Marks

Record – 10 Marks

Practical – 40 Marks

Break up of Practical – I (40 Marks)

Identification of function group of an organic compound (Systematic procedure should be adopted).

❖ Colour	-	1 Marks
❖ Physical State	-	1 Marks
❖ Odour	-	1 Marks
❖ MP / BP	-	2 Marks
❖ Ignition Test	-	2 Marks
❖ Litmus Test	-	2 Marks
❖ Solubility & Classification basing on solubility data	-	5 Marks
❖ Detection of extra elements	-	4 Marks
		(2 Marks for extract)
❖ Unsaturation Test (with bromine water and Bayer's Test)	-	4 Marks
Identification of functional group	-	5 Marks
❖ Confirmatory test for function group (1 test)-		5 Marks
❖ Anyone derivative of the organic compound-		4 Marks (1 x 4)
Report	-	4 Marks

Total Marks - 40 Marks

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SYLLABUS FOR I B.SC.(HONOURS) CHEMISTRY II SEMESTER

(wef 2019-20 onwards)

PAPER-IIB: PHYSICAL CHEMISTRY-II

COURSE CODE : CHH102

Total Hours: 60

Unit – I - PHASE EQUILIBRIA:

(16 Hours)

Concept of phases, components and degree of freedom, derivation of Gibbs Phase Rule for Non- reactive and reactive systems; Clausius –Clapeyron equation and its applications to solid-liquid, liquid – vapour and solid – vapour equilibria, phase diagram for one component systems with applications.

Phase diagram for systems of solid – liquid equilibria involving eutectic, congruent and incongruent melting points, solid solutions.

UNIT – II - CHEMICAL KINETICS:

(14

Hours)

Order and molecularity of a reaction, rate law in terms of the advancement of a reaction, differential and integrated form of rate expressions up to second order reactions,

Theories of reaction rates – collision theory, Transition state theory, factors affecting reaction rates. Arrhenius equation.

UNIT – III - SURFACE CHEMISTRY:

(16 Hours)

Adsorption: Physical adsorption, chemisorption, adsorption isotherms, Nature of adsorbed state.

Catalysis: Types of catalyst, specificity and selectivity, mechanisms of catalysed reactions at solid surfaces. Enzyme catalysis. Michaelis – Menten mechanism, acid-base catalysis.

UNIT – IV - VOLUMETRIC ANALYSIS:

(14 Hours)

Definition: Titrimetry, Volumetric titrimetry, Gravimetric titrimetry. The equivalence point and End point.

Classification of Volumetric methods.

Principles – Acid – base titration – Redox titrations – Complexometric titrations – Precipitation titrations – Non aqueous solutions (Introduction only)

Types of Errors: Accuracy and Precision, Absolute and relative uncertainty, Gaussian distribution, mean and standard deviation, confidence intervals, significant figures.

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MODEL QUESTION PAPER BLUE PRINT

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PAPER-IIB

PHYSICAL CHEMISTRY – II

SEMESTER-II

S.No.	Chapter	Essay questions (7 M) Knowledge/ skill	Short answer question(4M) Understanding	Very short answer questions(2M) Applications
1	Unit-I	02	02	-
2	Unit-II	02	02	01
3	Unit-III	02	02	01
4	Unit-IV	02	02	01
Total number of questions		08	08	03

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B.Sc., FIRST YEAR CHEMISTRY (HONORS) SEMESTER-II
MODEL QUESTION PAPER FOR PAPER-IIB
(wef 2019-20 onwards)
PAPER-IIB - PHYSICAL CHEMISTRY – II

Part-A

Time: 2 ½ hrs

Marks: 50 M

Answer all Questions

4 X 7 = 28 M

1. Derive the Clausius-Clapeyron equation and write the one application of liquid-vapour.

(OR)

What is incongruent melting point? Explain the system of solid-liquid (NaCl-H₂O) equilibria along with phase diagram.

2. What is rate of reaction? Derive the equation of second order reaction having same type of reactants.

(OR)

Write about simple collision theory of gaseous reactions.

3. What is adsorption isotherms? And derive the Langmuir adsorption isotherm.

(OR)

Derive the Michaelis-Menten equation.

4. Explain different types of Errors.

(OR)

Define complexometric titration and explain the method of complexometric titration by giving one example.

Part-B

Answer any FOUR Questions

4 x 4 =16 M

5. Define congruent and incongruent melting point.
6. Derivation of Gibb's phase rule for reacting system.
7. Derive the equation of zero order reaction.
8. Derivation of Arrhenius equation.
9. Derive the equation of Freundlich Adsorption isotherm.
10. What is selectivity and specificity catalyst with one example each.
11. Explain Accuracy and Precision
12. Derive the Gaussian distribution law.

Part-C

Answer all Questions

3 X 2 = 6 M

13. Write the effect of temperature on rate of reaction.
14. What is adsorption, adsorbate and adsorbent?
15. What is Redox titration and give one example.

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PRACTICAL PAPER –IIB FROM 2019-20 ONWARDS
LABORATORY COURSE –IIB
SYLLABUS FOR PRACTICAL -IIB: QUANTITATIVE ANALYSIS

- 1) Estimation of Acetic acid in Vinegar sample using standard HCl solution
- 2) Estimation of Fe(II) using KMnO_4 with Oxalic acid As primary standard.
- 3) Estimation of Fe(II) using $\text{K}_2\text{Cr}_2\text{O}_7$.
- 4) Estimation of Ca using EDTA.
- 5) Estimation of Mg using EDTA.
- 6) Determination of hardness of water.
- 7) Nickel dimethyl glyoxime – Gravimetric Analysis.

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PRACTICAL PAPER –IIB FROM 2019-20 ONWARDS
PRACTICAL -IIB: QUANTITATIVE ANALYSIS
SCHEME OF VALUATION

Max.Marks: 50 Marks

Time: 3 Hrs

- | | |
|------------------|----------|
| 1) For Record | 10 Marks |
| 2) For Practical | 40 Marks |

Splitting of Practical Marks:

- | | |
|--------------------------|---------|
| i) Procedure in 10 min: | 5 Marks |
| ii) Formula with units: | 5 Marks |
| iii) Neat tabulation: | 5 Marks |
| iv) Correct calculation: | 5 Marks |

- | | |
|---------------|--------------------------|
| Error < 10 % | 20 Marks |
| Error 10-15 % | 15 Marks |
| Error > 15 % | 10 Marks (Minimum Marks) |

GOVT. COLLEGE (AUTONOMOUS), RAJAHMUNDRY
DEPARTMENT OF CHEMISTRY
SYLLABUS FOR II B.Sc., IV SEMESTER
FROM 2019 -20 ONWARDS

SPECTROSCOPY & PHYSICAL CHEMISTRY

Total Hours: 60

UNIT-I: SPECTROSCOPY – I

14 Hours

A) SPECTROPHOTOMETRY

7 Hours

General features of absorption - 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

a) ELECTRONIC SPECTROSCOPY

7 Hours

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 molecules. Concept of Chromophore and Auxochrome. Bathochromic shift, Hypsochromic shift, hyper chromic shift, hypochromic shift. Effect of conjugation on λ_{max} .

UNIT-II: SPECTROSCOPY – II

16 Hours

a) INFRARED SPECTROSCOPY

6 Hours

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

b) Proton Magnetic Resonance Spectroscopy (1H -NMR)

10 Hours

Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, NMR splitting of signals - spin-spin coupling, coupling constants. Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde, 1, 1, 2-tribromo ethane, ethyl acetate, toluene and Acetophenone.

UNIT-III: DILUTE SOLUTIONS AND PHASE RULE**16 Hours****a) DILUTE SOLUTIONS****10 Hours**

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. Osmosis, osmotic pressure, experimental determination. Theory of dilute solutions. Determination of molecular weight of non-volatile solute from osmotic pressure. Abnormal Colligative properties- Van't Hoff factor.

b) PHASE RULE**6 Hours**

Concept of phase, components, degrees of freedom. Thermodynamic Derivation of Gibbs phase rule. Phase equilibrium of one component system - water system. Phase equilibrium of two- component system, solid-liquid equilibrium. Simple eutectic diagram of Pb-Ag system, simple eutectic diagram, desilverisation of lead, NaCl-Water system, freezing mixtures.

UNIT-IV: ELECTROCHEMISTRY**14 Hours****a) ELECTROCHEMISTRY-I****10 Hours**

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

b) ELECTROCHEMISTRY-II**4 Hours**

Single electrode potential, sign convention, Reversible and irreversible cells Nernst Equation- Reference electrode, Standard Hydrogen electrode, calomel electrode, Indicator electrode, metal – metal ion electrode, Inert electrode, Determination of EMF of cell, Applications of EMF measurements - Potentiometric titrations.

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

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SPECTROSCOPY & PHYSICAL CHEMISTRY

Sl. No.	Unit	Essay Question (08 M) knowledge	Short Answer Question (04 M) Understanding	Very Short Answer Question (02 M) Skill / Application
1.	UNIT-I: SPECTROSCOPY – I	02 (1 from a + 1 from b)	02	01
2.	UNIT-II: SPECTROSCOPY – II	02 (1 from a + 1 from b)	02	01
3.	UNIT-III: DILUTE SOLUTIONS AND PHASE RULE	02 (1 from a + 1 from b)	02	01
4.	UNIT-IV: ELECTROCHEMISTRY	02 (1 from a + 1 from b)	02	01
TOTAL NO. OF QUESTIONS		08	08	04

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DEPARTMENT OF CHEMISTRY
MODEL QUESTION PAPER FOR II B.Sc., IV SEMESTER
FROM 2019 -20 ONWARDS

SPECTROSCOPY & PHYSICAL CHEMISTRY

Time: 3hr.

Marks: 60M

PART -A

Note: Answer All the Questions.

గమనిక: అన్ని ప్రశ్నలకి సమాధానములిమ్ము.

4X8 = 32 M

1. (A) How do you estimate the amount of chromium in potassium dichromate and manganese in Manganous Sulphate spectrophotometrically.

సెప్టోఫోటోమీటర్ ను ఉపయోగించి పొటాషియం డైక్రోమేట్ నందలి క్రోమియం భారమును, మాంగనీస్ సల్ఫేట్ నందలి మాంగనీస్ భారమును లెక్కించుము.

Or/ లేదా

- (B) Define chromophore and auxochrome. How does the conjugation, affect the λ_{max} .

క్రోమోఫోర్, ఆక్సో క్రోమ్ లను నిర్వచించుము. λ_{max} విలువను సంయుక్తం ఏ విధంగా ప్రభావితం చేస్తుంది?

2. (A) Give a short note on the factors that influence the stretching & bending vibrations.

సాగే మరియు వంగే కంపనాలను ప్రభావితం చేసే కారకాలను వివరించండి.

Or/ లేదా

- (B) Write the principle NMR spectroscopy. What is chemical shift equivalence? How many different NMR signals you will see in the following molecules? Ethanol, Ethyl Acetate, and Acetophenone.

NMR వర్ణపట శాస్త్రము యొక్క సూత్రం తెలపండి. రసాయన స్థానంతరము అనగా ఏమి? ఇథనాల్, ఇథైల్ అసిటేట్ మరియు అసిటోఫీనాన్ అణువుల NMR వర్ణపటము లను గీసి వివరించండి.

6. (A) Derive the relationship between elevation in the boiling point and the molecular weight of the solute.

భాష్పిభవన స్థాన ఉన్నతి మరియు ద్రావిత అణుభారము మధ్య గల సంబంధమును రాబట్టండి.

Or/ లేదా

(B) Explain water system. Why freezing mixtures produce low temperatures.

నీరు-ప్రావస్థ ను వివరించండి. ఘనీభవన మిశ్రమములు అల్పఉష్ణోగ్రతలను ఏ విధంగా కలిగిస్తాయో తెలపండి.

7. (A) Explain Debye-Huckel-Onsager theory of strong electrolytes and derive its equation.

బలమైన విద్యుత్ విశ్లేష్య ముల యొక్క డీబీ-హకల్-ఆన్ సేగర్ సిద్ధాంతమును వివరించి సమీకరణాన్ని రాబట్టండి.

Or/ లేదా

(B) How E.M.F of the cell is measured? Write applications of E.M.F. measurements.

ఘటము యొక్క E.M.F ను ఎలా లెక్కగడతారు . E.M.F లెక్కింపుల యొక్క అనువర్తనాలను వ్రాయండి

PART-B

Note: Answer any **FIVE** Questions

5x4 = 20 M

8. Write Beer-Lambert's law and its limitations.

బీర్-లాంబర్ట్ నియమాన్ని అందలి పరిమితులను తెలపండి.

9. Write about various types of electronic transitions.

వివిధ రకాలైన ఎలక్ట్రానిక్ పరివర్తనాలను గూర్చి వ్రాయండి

10. What is finger print region in IR and discuss its significance in structure elucidation.

ఫింగర్ ప్రింట్ ప్రాంతం అనగా నేమి మరియు సమ్మేళన నిర్మాణ క్రమంలో ఈ ప్రాంతం యొక్క ప్రాముఖ్యత వివరించుము.

11. What is spin-spin coupling? How do you distinguish cis and trans alkenes using NMR spectroscopy.

స్పిన్-స్పిన్ సంధానం అనగా నేమి? NMR వర్ణపట శాస్త్రము ఉపయోగించి సిస్ మరియు ట్రాన్స్ ఆల్కైన్లను ఎలా వేరు చేస్తారు?

12. Define Raoult law. Write the relation between relative lowering of vapor pressure and molecular weight of the solute

రౌల్ట్ నియమాన్ని నిర్వచించండి. భాష్పిభవన నిమ్నత కు, ద్రావిత అణుభారానికి మధ్యగల సంబంధమును రాబట్టండి.

10. Define Eutectic point and congruent point.

యుటెక్టిక్ బిందువు, సంగత ద్రవీభవన స్థాన బిందువు లను నిర్వచించండి

11. Write the differences between electrolytic cell and electrochemical (galvanic) cells.

ఎలక్ట్రోలైటిక్ సెల్ మరియు ఎలక్ట్రోకెమికల్ (గాల్వానిక్) సెల్ మధ్య భేదాలను వ్రాయుము.

12 Calculate the EMF of the cell Cd/Cd²⁺//Cu²⁺/Cu at room temperature, standard reduction potential of Cd and Cu electrodes are respectively -0.40V and 0.34V.

గది ఉష్ణోగ్రత వద్ద Cd/Cd²⁺//Cu²⁺/Cu చర్య యొక్క EMF విలువను లెక్కించండి. Cd మరియు Cu

ఎలక్ట్రోడ్ల యొక్క ప్రామాణిక నిర్మూలన సామర్థ్యములు వరుసగా -0.40V మరియు 0.34V.

PART-C

Note: Answer ALL Questions

గమనిక: అన్ని ప్రశ్నలకి సమాధానములిమ్ము.

4x2 = 8M

13. Which electronic transition has a high ϵ value in acetone?

ఎసిటోన్ లోగల ఏ ఎలక్ట్రానిక్ పరివర్తన యొక్క ϵ విలువ ఎక్కువగా ఉంటుంది.

14. What is coupling constant (J)?

కప్లింగ్ స్థిరాంకము (J) అనగా నేమి?

15. What is degree of freedom?

స్వేచ్ఛ డిగ్రీ అనగా నేమి?

16. Draw the conductometric titration graph of strong acid versus weak base.

బలమైన ఆమ్లం మరియు బలహీన క్షారముల మధ్య కండక్టోమెట్రిక్ అంశమాపన గ్రాఫ్ గీయుము.

GOVT. COLLEGE (AUTONOMOUS), RAJAHMUNDRY
DEPARTMENT OF CHEMISTRY
PRACTICAL COURSE SYLLABUS FOR II B.Sc., IV SEMESTER
FROM 2019 -20 ONWARDS

TITRIMETRIC ANALYSIS

Time: 45 Hours (3h/w)

1. Determination of carbonate and bicarbonate mixture
2. Determination of Fe (II) using $K_2Cr_2O_7$
3. Determination of Fe (II) using $KMnO_4$ with oxalic acid as primary standard
4. Determination of Zn by EDTA
5. Determination of Ni by EDTA
6. Determination of Zn by ferrocyanide (precipitation titration)
7. Iodometry
8. Determination of hardness of water

GOVT. COLLEGE (AUTONOMOUS), RAJAHMUNDRY
DEPARTMENT OF CHEMISTRY
PRACTICAL COURSE FOR II B.Sc., IV SEMESTER
FROM 2019 -20 ONWARDS

TITRIMETRIC ANALYSIS

SCHEME OF VALUATION(EXTERNAL)

Max Marks: 50

Time: 3 Hours

- | | | |
|----|-----------------|-----------------|
| 1. | for Practical - | 40 Marks |
| 2. | for Record - | 10 Marks |

Break Up of Marks for Practicals:

- Procedure (in first 10 minutes) - **10 Marks**

Break up of marks for Procedure:

- a. Principle with equation and no. of moles
-5 Marks
- b. Procedure with a brief explanation of 3 stages of analysis mentioning the solutions taken in burette & pipette , indicator used and end point. – **5 Marks**

- Preparation of Standard solution- **4 Marks**
- Standardization of intermediate Solution **4 Marks**
- For tabulation of readings in 2 neat tabular forms - **5 Marks**
- Calculations - **4 Marks**
- Viva- **5 Marks**
- For the result < 1% error - **8 Marks**

Note: If the student does the experiment correctly and reports the volumes perfectly and may fail to arrive at correct answer by doing wrong calculation, 5 marks shall be deducted for wrong calculations.

2. Percentage of error shall be calculated on the weights actually reported but not on the volumes.
3. The scheme is expected to follow scrupulously.
4. The examiner is instructed to maintain worksheet in which he shall record the volumes, concentrations, weights the student is expected to report and actually reported and the percentage of error. This work sheet is maintained batch wise and shall be enclosed with answer scripts batch wise.

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GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM

DEPARTMENT OF CHEMISTRY

SYLLABUS FOR II B.SC., ANALYTICAL CHEMISTRY, IV SEMESTER

FROM 2019 – 2020 ONWARDS

PAPER – IV: SEPARATION METHODS - II

Unit-I: GEL, AFFINITY AND GAS CHROMATOGRAPHY

- A. Gel chromatography: Principle, types of gels, separation by gel chromatography, applications
- B. Affinity chromatography: Principle, materials, selection and attachment of ligand, practical procedure, applications
- C. Gas chromatography: Apparatus and materials, preparation and application of samples, separation conditions, detectors, applications

Unit-II: ELECTROPHORESIS

- A. Electrophoresis-I: Theory and classification, factors affecting mobility, macromolecular size and charge, interactions with supporting electrolyte, P^H and concentration discontinuities, factors affecting electrophoresis phenomena
- B. Electrophoresis-II: electrolysis, electro-osmosis, temperature and supporting media, instrumentation, methodology, preparation of gel-staining and de-staining, preparative zone electrophoresis, continuous electrophoresis, applications

Unit-III: DIALYSIS AND MEMBRANE FILTRATION AND GENERAL LABORATORY METHODS

- A. Dialysis and membrane Filtration: Dialysis, classification of dialysis: Electrodialysis (ED) and Reverse Electrodialysis (RED), types of filtrations: MicroFiltration (MF), UltraFiltration (UF), NanoFiltration (NF), and Reverse Osmosis (RO), Filters-nitrocellulose, fiberglass, polycarbonate
- B. General laboratory methods: Distillation, drying solvents, fractional crystallization, re-crystallization, acid-base, complexation and precipitation titrations, vacuum filtration.

Unit-IV: CENTRIFUGATION METHODS

Introduction, Basic principles of sedimentation and relative centrifugal force, preparative centrifugation and ultra centrifugation, different types of rotors, density gradients, types of centrifugation techniques:

References

1. R. V. Dilts: Analytical Chemistry- Methods of Separation.
2. O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic Methods.
3. F.W. Fifield and D. Kealy: Principles and practice of analytical chemistry.
4. Vogel's textbook of quantitative chemical analysis, 6th edition.
5. Vogel's textbook of quantitative chemical analysis, 7th edition.
6. Keith Wilson and John Walker: Practical Biochemistry.
7. David J. Holme and Hazel Peck: Analytical Biochemistry. 8. David Freifelder: Physical Biochemistry.

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM
DEPARTMENT OF CHEMISTRY
SYLLABUS FOR II B.SC., ANALYTICAL CHEMISTRY, IV SEMESTER
FROM 2019 – 2020 ONWARDS

MODEL PAPER

PART-A

Answer all questions

(4x8=32

Marks)

1. (a) Write the principle of Gel Chromatography and write different types of gels used in chromatography

OR

Write the principle of gas chromatography and write briefly about apparatus and materials used in gas-liquid chromatography.

2. Write the principles of electrophoresis and write the factors affecting the electrophoresis

OR

Write a note on preparative zone and continuous electrophoresis

3. Write briefly about nitrocellulose and fiber glass filters

OR

Write briefly about general laboratory methods

4. Write briefly about the centrifugal methods

OR

Write a note on different types of rotors

PART-B

Answer any five questions

(5x4=20

Marks)

5. Write a note on detectors of gas chromatography
6. Write a note on practical procedure of affinity chromatography
7. Write a note on the effect of charge and macromolecular size in electrophoresis
8. Write the applications of electrophoresis
9. Briefly write about polycarbonate
10. Write about dialysis and membrane filtration
11. Write the different types of centrifugation techniques
12. Write about sedimentation process

PART-C

Answer all questions

(4x2=8

Marks)

13. Write the principle of affinity chromatogram
14. Write a note about supporting media used in electrophoresis
15. Define the ultra-centrifugation.
16. Define crystallization?

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM

DEPARTMENT OF CHEMISTRY

II B.SC., ANALYTICAL CHEMISTRY, IV SEMESTER

BLUE PRINT FROM 2019-20 ONWARDS

PAPER-IV: SEPARATION METHODS-II

Sl. NO.	Chapter	Essay Question (08 M) knowledge	Short Answer Question (04 M) Under standing	Very Short Answer Question (02 M) Skill / Application
1.	UNIT-I : GEL, AFFINITY AND GAS CHROMATOGRAPHY	02	02	01
2.	UNIT-II: ELECTROPHORESIS	02	02	01
3.	UNIT : III DIALYSIS AND MEMBRANE FILTRATION AND GENERAL LABORATORY METHODS	02	02	01
4.	UNIT:IV CENTRIFUGATION METHODS	02	02	01
Total no of Questions		08	08	04

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
B.Sc. FIRST YEAR CHEMISTRY, II SEMESTER
PRACTICAL COURSE FROM 2019-20 ONWARDS
PRACTICAL PAPER-II: SEPARATION TECHNIQUES
SYLLABUS FOR SEPARATION TECHNIQUES

Time: 45 Hours (3

Hrs/Wk)

1. Determination of the strength of the given HCl solution by titrating it against NaOH solution conductometrically
2. Separation of a mixture of Ni^{2+} and Cu^{2+} by TLC and identify the ions.
3. Determination residual chlorine in city water supply using colorimetry
4. Determination of adsorption isotherm and adsorption constant (k) of acetic acid on activated charcoal.
5. Determination of nicotine content in cigarette tobacco

References

1. R. V. Dilts: Analytical Chemistry- Methods of Separation.
2. O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic Methods.
3. F.W. Fifield and D.Kealy: Principles and practice of analytical chemistry.
4. Vogel's textbook of quantitative chemical analysis, 6th edition.
5. Vogel's textbook of quantitative chemical analysis, 7th edition.
6. Keith Wilson and John Walker: Practical Biochemistry.
7. David J.Holme and Hazel Peck: Analytical Biochemistry. 8. David Freifelder: Physical Biochemistry.

SCHEME OF VALUATION

Time: 3 Hours

Total: 50 marks

Scheme for External Examination

1) Record: 10 Marks

2) Practical: 40 Marks

SCHEME OF VALUATION:

For Record - 10 Marks

For Practical - 40 Marks

Splitting of Practical Marks:

- i) Procedure in first 10 min. : 5 Marks
- ii) Formula with units : 5 Marks
- iii) Neat Tabulation : 5 Marks
- iv) Correct Calculation : 5 Marks

Error < 10%: 20 Marks

Error 10-15 %: 15 Marks

Error > 15 %: 10 Marks (Minimum Marks)

TOTAL MARKS: 50

GOVT. COLLEGE (AUTONOMOUS), RAJAHMUNDRY
DEPARTMENT OF CHEMISTRY
SYLLABUS FOR III B.Sc., VI SEMESTER
FROM 2019 -20 ONWARDS

VII A - ANALYTICAL METHODS IN CHEMISTRY

TOTAL HOURS: 45

UNIT-I

Quantitative analysis: **10 Hours**

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, coprecipitation, post precipitation, digestion, filtration and washing of precipitate, drying and ignition.

UNIT-II

7 Hours

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 Hours**

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
Hours

10

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

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

UNIT –V**10 Hours**

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.

ADDITIONAL INFORMATION @ INTELLECTUAL PROPERTY RIGHTS

UNIT I

Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics – Types of Intellectual Property – Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement – Regulatory – Over use or Misuse of Intellectual Property Rights – Compliance and Liability Issues.

UNIT II

Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works – Rights of Distribution – Rights of performers – Copyright Formalities and Registration – Limitations – Infringement of Copyright – International Copyright Law Semiconductor Chip Protection Act.

UNIT III

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting – Patent Searching – Patent Cooperation Treaty – New developments in Patent Law- Invention Developers and Promoters.

UNIT IV

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Inter parties Proceedings – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law.

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
6. Deborah E. Bouchoux: “Intellectual Property”. Cengage learning, New Delhi
7. Kompal Bansal & Parishit Bansal “Fundamentals of IPR for Engineers”, BS Publications (Press)
8. Prabhuddha Ganguli: ‘ Intellectual Property Rights’ Tata Mc-Graw – Hill, New Delhi
9. Richard Stim: “Intellectual Property”, Cengage Learning, New Delhi.

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III B.SC. CHEMISTRY ELECTIVE PAPER – VIIA

SEMESTER – VI

ANALYTICAL METHODS IN CHEMISTRY

S. NO.	Chapter	Hours Required	Essay Question (08 M) knowledge	Short Answer Question (04 M) Understanding	Very Short Answer Question (02 M) Skill / Application
1.	Quantitative analysis	10	02	01	01
2.	Treatment of analytical data	07	02	02	01
3.	Separation techniques in chemical analysis	08	02	01	01
4.	Chromatography-I	10	01	02	--
5.	Chromatography-II	10	01	02	01
Total no of Questions		45	08	08	04

MODEL QUESTION PAPER
GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM
III B.Sc., DEGREE EXAMINATIONS
SEMESTER-VI
PAPER VII-A: ELECTIVE – A
ANALYTICAL METHODS IN CHEMISTRY

Time: 3Hrs

Max. Marks: 60 M

PART-A

4X 8 =32Marks

I. Answer **ALL** of the following questions. Each question carries **EIGHT** marks.
క్రింది వానిలో అన్ని ప్రశ్నలకు సమాధానములు వ్రాయండి .ప్రతి ప్రశ్నకు ఎనిమిది మార్కులు

1. A) Describe the choice of indicators for acid-base titrations.
ఆమ్ల-క్షార అంశమాపక సూచికను ఎన్నుకొను విధానము వివరింపుము .

OR/ లేదా

B) What is the principle of Gravimetric analysis and explain co-precipitation and Post-precipitation with suitable examples.

భారత్మక విశ్లేషణము యొక్క సూత్రము ఏమిటి .మరియు సహా -అవక్షేపపు మరియు ఉత్తర - అవక్షేపపులను ఉదాహరణలతో వ్రాయండి .

2. A) i) Define and explain the terms accuracy and precision
ii) Define standard deviation and confidence limit.

i) ఖచ్చితత్వము మరియు సున్నితత్వము అను పదములను తెలిపి వాటి గూర్చి వివరించండి .

ii) క్రమ విచలనం మరియు విశ్వాస పరిమితులను నిర్వచించండి .

OR/ లేదా

B) Discuss various types of errors.

వివిధ రకాల దోషాలను గూర్చి చర్చించుము .

3. A) Write the principle and application of solvent extraction.
ద్రావణి నిష్కర్షణకు సూత్రమును మరియు అనువర్తనాలను వ్రాయండి .

OR / లేదా

B) Explain any two methods for solvent extraction.

ద్రావణి నిష్కర్షణకు ఏవేని రెండు పద్ధతులను వివరింపుము .

4. A) Give the experimental procedure of paper chromatography. Write any of its applications.

కాగిత క్రోమటోగ్రఫీ యొక్క ప్రయోగాత్మక విధానము ఇచ్చి ఏవేని రెండు అనువర్తనాలను వ్రాయండి.

OR / లేదా

- B) Write the preparation of thin layer chromatography plates. Explain the principle and applications of thin layer chromatography

పలుచని పొర క్రోమటోగ్రఫీ పలకల యొక్క తయారీని వ్రాయండి. పలుచని పొర క్రోమటోగ్రఫీ యొక్క సూత్రము మరియు అనువర్తనాలను వ్రాయండి.

PART-B

5 X 4 = 20 Marks

- II** Answer any **FIVE** of the following questions. Each question carries **FOUR** marks.

క్రింది వానిలో ఏవైనా ఐదు ప్రశ్నలకు సమాధానములు వ్రాయండి. ప్రతి ప్రశ్నకు నాలుగు మార్కులు

5. Discuss the complex metric titrations with examples.

సంక్లిష్ట అంశమాపనాలు గూర్చి ఉదాహరణలతో వివరింపుము.

6. Explain about precipitation and coagulation.

అవక్షేపపు మరియు స్కంధనములను వివరింపుము.

7. Write about standard deviation.

క్రమ విచలనము గూర్చి వ్రాయుము .

8. How do you estimate Fe (III) using solvent extraction method?

ద్రావణి నిష్కర్షణ పద్ధతిని ఉపయోగించి Fe (III) ను ఎలా నిర్ణయిస్తారు .

9. Describe the development of chromatogram in paper chromatography.

కాగిత క్రోమటోగ్రఫీ లో క్రోమటోగ్రామ్ అభివృద్ధి గూర్చి తెలుపుము .

10. What are the factors affecting R_f value.

R_f విలువను ప్రభావితం చేసే అంశాలు ఏమిటి .

11. What type of adsorbents and solvents used in thin layer chromatography.

పలుచని పొర క్రోమటోగ్రఫీ నందు ఎటువంటి అధిశోషకములు మరియు ద్రవణులను ఉపయోగిస్తారు.

12. Write the applications of High Performance Liquid Chromatography.

అధిక సామర్థ్య ద్రవ క్రోమటోగ్రఫీ యొక్క ఉపయోగములు తెలుపుము.

PART – C

4 X 2 = 8 Marks

III Answer **ALL** of the following questions. Each question carries **TWO** marks

క్రింది అన్ని ప్రశ్నలకు సమాధానములు వ్రాయండి. ప్రతి ప్రశ్నకు రెండు మార్కులు

13. What is co-precipitation and post-precipitations?

సహా – అవక్షేపపు మరియు ఉత్తర – అవక్షేపపు అనగా నేమి ?

14. Define accuracy and precision.

ఖచ్చితత్వము మరియు సున్నితత్వము తెల్పండి.

15. What is R_f value. Write the formula of R_f value.

R_f విలువను అనగానేమి? R_f విలువను యొక్క సూత్రమును వ్రాయుము.

16. Define Stationary Phase and Mobile Phase.

స్థిర ప్రావస్థ మరియు చర ప్రావస్థ లను తెల్పండి.

CHEMISTRY LABORATORY COURSE – VII-A

(at the end of semester VI)

30 hrs (2 h / w)

50 Marks

1. Identification of amino acids by paper chromatography.
2. Determination of Zn using EDTA
3. Determination of Mg using EDTA

CHEMISTRY LABORATORY COURSE – VII-A

(at the end of semester VI)

Time: 3 hrs.

Max.Marks:50

SCHEME OF VALUATION

For Record	- 10 Marks
For Viva-voce	- 5 Marks
For Practical	- 35 Marks

Splitting of Practical Marks

i)	Procedure in first 10 min	: 5 Marks
ii)	Formula with units	: 5 Marks
iii)	Neat tabulation	: 5 Marks
iv)	Correct calculation	: 20 Marks
	Error < 10%	: 20 Marks
	Error 10-15 %	: 15 Marks
	Error > 15 %	: 10 Marks (Minimum Marks)

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
SYLLABUS FOR VI SEMESTER
III B.Sc. CHEMISTRY ELECTIVE – VIIB
ENVIRONMENTAL CHEMISTRY
(with effect from 2018 – 19)

No. of Hours: 45Hrs

UNIT-I: Introduction to Environmental Chemistry **8 h**

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 and Non-renewable resources – Thermal
power and atomic energy – Reactions of atmospheric oxygen and Hydrological cycle.

UNIT-II: Air Pollution **8h**

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: Radio Active Pollution and Chemical Toxicology **10 h**

Radio active Pollution: Definition and types of radio active pollution, biological effects
of radioactive pollution, cellular phones, Networks and nuclear power plants as a source of
radiation

Chemical Toxicology : 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: Ecosystem and Biodiversity. **10 h**

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 – Biogeochemical cycles (carbon, nitrogen and phosphorus).

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.

REFERENCE BOOKS:

1. Fundamentals of Ecology by M.C. Dash

2. A Textbook of Environmental Chemistry by W. Moore and F. A. Moore
3. Environmental Chemistry by Samir K. Banerji

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III B.SC. CHEMISTRY ELECTIVE PAPER – VIIB
SEMESTER – VI
ENVIRONMENTAL CHEMISTRY
ACADEMIC YEAR 2018 - 2019

Sl. NO.	Chapter	Essay Question (08M) knowledge	Short Answer Question (04 M) Understanding	Very Short Answer Question (02 M) Skill / Application
1.	Introduction of Environmental Chemistry	02	01	01
2.	Air Pollution	02	02	01
3.	Water Pollution	02	01	01
4.	Radioactive Pollution & Chemical Toxicology	01	03	--
5.	Ecosystem and Biodiversity	01	01	01
Total no of Questions		08	08	04

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
SYLLABUS FOR VI SEMESTER
III B.Sc. CHEMISTRY ELECTIVE – VIIB
MODEL PAPER

III B.Sc. DEGREE FINAL YEAR EXAMINATIONS
SEMESTER VI
Paper –VII B: ELECTIVE – B
ENVIRONMENTAL CHEMISTRY
(wef 2018-19)

Time: 3 hours

Maximum Marks: 75M

PART – A

Answer All Questions. Each question carries eight marks.

4 x 8 = 32 Marks

అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము? ప్రతి సమాధానం నకు ఎనిమిది మార్కులు.

1) Explain the segments of the environment.

పర్యవరణం లోని ఖండకలను వివరించుము?

(OR)

b) Write about renewable energy sources?

కృత్రిమ శక్తి వనరుల గూర్చి వ్రాయుము?

2) a) Discuss in detail about air pollution.?

వాయు కాలుష్యం గూర్చి వివరంగా చర్చించుము?

(OR)

b).Describe the Green House Effect?

హరిత గృహ ప్రభావం గూర్చి వివరించుము?

3) a) Explain the methods to convert permanent hard water to soft water.?

శాశ్వత కఠినజలం ను సాధుజలం గా మార్చు విధానాలను వివరించండి?

(OR)

b). Principle of wastage treatment and Industrial waste water treatment.

వ్యర్థజలం ను శుద్ధి చేయు సూత్రము మరియు పరిశ్రమల వ్యర్థజలంను ఏవిధంగా శుద్ధి చేస్తారు?

4) a). Give detailed account on biodiversity?

జీవవైవిధ్యం గూర్చి సవివరంగా తెలియ జేయుము?

(OR)

b). Define Radioactive pollution and Explain adverse effects of radioactive pollution on Biological system?

రెడియోధార్మిక కాలుష్యం ను నిర్వచించి ? జీవవ్యవస్థ పై రెడియోధార్మిక కాలుష్యం వల్ల సంభవించు

జీవ సంబంధ ప్రతికూలతలను వివరించుము?

PART – B

Answer any Five of the following questions.

5X4 =20 Marks

ఏవైనా ఐదింటికి సమాధానాలు వ్రాయుము?

5) Explain the importance of environment in now-a-days.

ప్రస్తుత రోజులలో పర్యవరణం యొక్క ప్రాముఖ్యతను వివరించండి?

6) What is Bhopal gas disaster?

బోపాల్ గ్యాస్ దుర్ఘటన అనగానేమి?

7) Explain formation and depletion of Ozone?

ఓజోన్ పొర క్షీణత గూర్చి వివరించండి?

8) Explain Eutrophication and it's Effects?

యూట్రోఫికేషన్ అనగా నేమి ? దాని ఫలితాలను వివరించండి?

9) Explain adverse effects of cellular networks radiation?

సెల్ ఫోస్ నెట్ వర్క్ ల వలన కలుగు దుష్ప్రతికూలను వివరించండి?

- 10) Explain Pesticide's and it's biochemical effects?
పురుగు మందులు అనగానేమి? వాటి జీవ రసాయన ప్రభావం వివరించండి?
- 11) Explain toxic effects of Lead and Mercury?
లెడ్ మరియు పాదరసం యొక్క విషప్రభావం వివరించండి?
- 12) What are the Functions of Eco system?
ఆవరణ వ్యవస్థ యొక్క విధులేవి ?

PART – C

4X2 = 8 Marks

Answer All Questions, Each Question, carries two marks

అన్ని ప్రశ్నలకు సమాధానాలు వ్రాయుము?

- 13) Define Thermal power and Atomic energy?
ఉష్ణశక్తి మరియు పరమాణుశక్తి అనగానేమి?
- 14) What is photochemical smog?
కాంతి రసాయన పొగ అనగానేమి?
- 15) Define COD and BOD?
COD మరియు BOD లను నిర్వచించుము?
- 16) What is Food chain and Bio mass?
ఆహారపు గొలుసు మరియు జీవ ద్రవ్యరాశి అనగానేమి?

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**GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
SYLLABUS FOR VI SEMESTER
III B.Sc. CHEMISTRY VI SEMESTER -
SYLLABUS FOR VIIC -GREEN CHEMISTRY**

Total Hours : 45

UNIT-I

10hr

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 anthraquinones, 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)

UNIT V

10 h

Examples of green synthesis / reactions and some real world cases: 1. Green synthesis of the following compounds: adipic acid, catechol, disodium imino diacetate (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

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM.

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III B.SC. CHEMISTRY ELECTIVE PAPER – VIIC

SEMESTER – VI

GREEN CHEMISTRY

Sl. NO.	Chapter	Essay Question (08 M) knowledge	Short Answer Question (04 M) Under standing	Very Short Answer Question (02 M) Skill / Application
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1.	Green Chemistry	01	01	01
2.	Selection of solvent	01	02	01
3.	Microwave and Ultrasound assisted green synthesis	01	01	01
4.	Green catalysis	01	02	--
5.	Green Synthesis	01	02	01
Total no of Questions		05	08	04

MODEL QUESTION PAPER

GOVERNMENT COLLEGE (AUTONOMOUS) RAJAMAHENDRAVARAM

THREE YEAR B.Sc., DEGREE EXAMINATIONS

SEMESTER-VI

PAPER VII- C : ELECTIVE – C

GREEN CHEMISTRY

Time: 3Hrs

Max. Marks: 60 M

PART-A

4 X 8 =32 Marks

I. Answer **ALL** of the following questions. Each question carries **EIGHT** marks.
క్రింది వానిలో ఏవైనా అన్ని ప్రశ్నలకు సమాధానములు వ్రాయండి .ప్రతి ప్రశ్నకు ఎనిమిది మార్కులు

1. A) Explain the basic principles of green chemistry.
హరిత రసాయన శాస్త్రము యొక్క ప్రాథమిక సూత్రాలను వ్రాయండి .

(OR)

B) Illustrate the sonication method with any two reactions.

సోనికేషన్ పద్ధతిలో ఏవైనా రెండు చర్యలను వివరించండి .

2. A) Write about the reactions in ionic liquids.
అయానిక ద్రావణాలలో చర్యలను గూర్చి వ్రాయండి .

(OR)

B) Describe the preparation and properties of super critical Carbon dioxide.

సందిగ్ధ CO₂ యొక్క తయారీ మరియు ధర్మాలను చర్చించుము.

3. A) Explain the synthesis of fused Anthroquinines by microwave assisted organic synthesis.
సుక్ష్మ తరంగ సహాయక కర్పన సంశ్లేషణ ద్వారా గలన ఆంత్రాక్విన్లోన్ల యొక్క సంశ్లేషణాన్ని వివరించండి .

(OR)

B) Write the green synthesis procedures for Cannizaro reaction and Aldol condensation.

కనిజారో చర్య మరియు ఆల్డోల్ సంఘననము హరిత సంశ్లేషణ విధానములో వ్రాయండి .

4. A) What is Phase transfer catalyst? How do they function?
దశ బదిలి ఉత్ప్యరకము అనగానేమి ? అవి ఎలా పనిచేయును .

(OR)

B) Describe the green synthesis of Diel's – Alder reaction of Hofmann elimination.

డిల్స్^{ఎఫ్} - ఆల్డోర్ చర్య మరియు హోఫ్ మన్ బహిష్కరణలను హరిత సంశ్లేషణ విధానములో వివరించండి .

PART-B

5 X 4 = 20 Marks

II. Answer any **FIVE** of the following questions. Each question carries **FOUR** marks.

క్రింది వానిలో ఏవైనా నాలుగు ప్రశ్నలకు సమాధానములు వ్రాయండి .ప్రతి ప్రశ్నకు ఐదు మార్కులు

5. What is the need of green chemistry?
హరిత రసాయన శాస్త్రం యొక్క అవసరము ఏమిటి?
6. Write a note on atom economy reactions.
పరమాణు దక్షత చర్య మీద వ్యాఖ్య వ్రాయండి .
7. Heck reaction.
హెక్ చర్య .
8. Write about solid supported synthesis.
ఘన సహాయ సంశ్లేషణము గూర్చి వ్రాయండి .
9. What are the advantages of microwaves assisted organic synthesis.
సుక్ష్మ తరంగ సహాయక కర్పన సంశ్లేషణము యొక్క ఉపయోగము ఏమిటి?
10. Bio catalysis.
జీవ ఉత్పేరణ.
11. How do you perform Stricker synthesis by green synthesis method?
హరిత సంశ్లేషణ పద్ధతి ద్వారా స్ట్రీక్కర్ సంశ్లేషణని ఎలా ప్రదర్శిస్తారు.
12. Ultra sound assisted reactions.
అతి ధ్వని సహాయక చర్యలు .

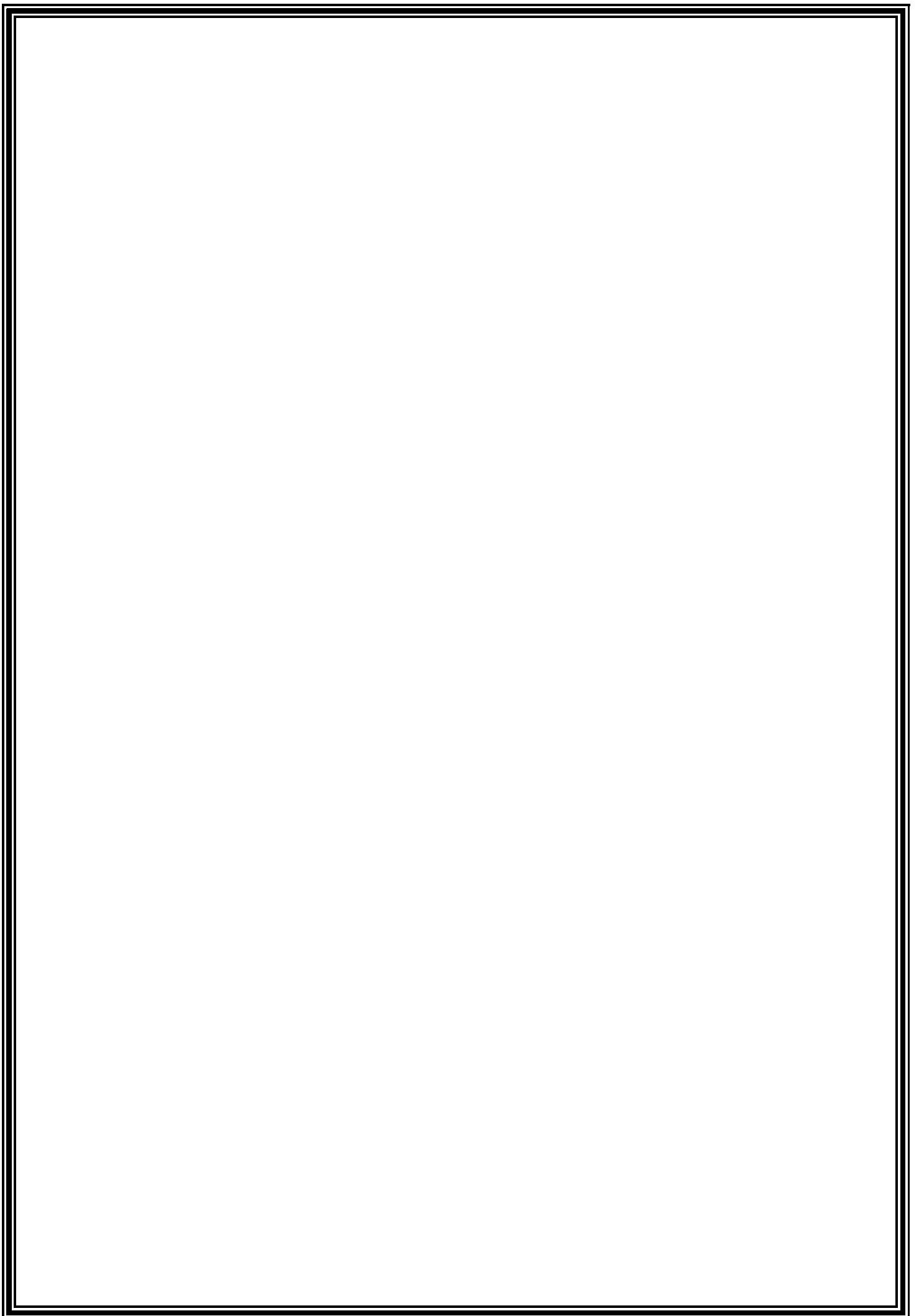
PART – C

4X 2 = 8 Marks

III. Answer ALL of the following questions. Each question carries TWO marks

క్రింది వానిలో ఏవైనా అన్ని ప్రశ్నలకు సమాధానములు వ్రాయండి .ప్రతి ప్రశ్నకు రెండు మార్కులు

13. Write the sono chemical Wittig reaction.
సోనో రసాయన విట్టిగ్ చర్యను వ్రాయండి .
14. Write Suzuki reaction.
సుజుకి చర్యను వ్రాయండి .
15. What is Heterogeneous catalysis? Write any two uses of Zeolites.
విజాతి ఉత్పేరణ అనగానేమి ? జయోలైట్స్ యొక్క ఏవేని రెండు ఉపయోగాలను వ్రాయండి .
16. Write the sono chemical Simmons – Smidth reaction.
సిమ్మన్స్ – స్మిత్ సోనో రసాయన చర్యను వ్రాయుము .



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

30 hrs (2 h / w)

50 Marks

1. Identification of amino acids by paper chromatography.
2. Determination of Zn using EDTA
3. Determination of Mg using EDTA

CHEMISTRY LABORATORY COURSE – VII-A

(at the end of semester VI)

Max. Marks: 50

Time: 3 hrs.

SCHEME OF VALUATION

For Record - 10 Marks
For Viva-voce - 5 Marks
For Practical - 35 Marks

Splitting of Practical Marks

i) Procedure in first 10 min. : 5 Marks

ii) Formula with units : 5 Marks

iii) Neat tabulation & correct calculation : 5 Marks

Error < 10% : 20 Marks

Error 10-15 % : 15 Marks

Error > 15 % : 10 Marks (Minimum Marks)

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

45 hrs (3 h / w)

50 Marks

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

CHEMISTRY LABORATORY COURSE – VII-B

(at the end of semester VI)

Max. Marks: 50

Time: 3 hrs.

SCHEME OF VALUATION

For Record - 10 Marks
For Viva-voce - 5 Marks
For Practical - 35 Marks

Splitting of Practical Marks

i) Procedure in first 10 min. : 5 Marks

ii) Formula with units : 5 Marks

iii) Neat tabulation & correct calculation : 5 Marks

Error < 10% : 20 Marks

Error 10-15 % : 15 Marks

Error > 15 % : 10 Marks (Minimum Marks)

CHEMISTRY LABORATORY COURSE – VII-C

(at the end of semester VI)

30 hrs (2 h / w)

50 Marks

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

CHEMISTRY LABORATORY COURSE – VII-C

(at the end of semester VI)

Max. Marks:50

Time: 3 hrs.

SCHEME OF VALUATION

For Record - 10 Marks
For Viva-voce - 5 Marks
For Practical - 35 Marks

Splitting of Practical Marks

- | | | |
|------|---------------------------|----------------------------|
| i) | Procedure in first 10 min | : 5 Marks |
| ii) | Formula with units | : 5 Marks |
| iii) | Neat tabulation | : 5 Marks |
| iv) | Correct calculation | : 20 Marks |
| | Error < 10% | : 20 Marks |
| | Error 10-15 % | : 15 Marks |
| | Error > 15 % | : 10 Marks (Minimum Marks) |

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
DEPARTMENT OF CHEMISTRY
CBCS Syllabus for B.Sc. III Year
Effective from 2017 – 2018 onwards
Paper - VIII-A-1 Semester – VI
POLYMER CHEMISTRY

TOTAL HOURS: 45

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, Osmometry and light scattering 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

Polymer additives:

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

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, New York, 1967.

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III B.SC. CHEMISTRY PAPER VIII-A-1
SEMESTER – VI

POLYMER CHEMISTRY

Sl. NO.	Chapter	Essay Question (08 M) knowledge	Short Answer Question (05 M) Under standing	Very Short Answer Question (02 M) Skill / Application
1.	Introduction of polymers	02	02	01
2.	Techniques of Polymerization	02	02	--
3.	Kinetics of polymers	01	02	01
4.	Polymer additives	02	01	01
5.	Polymers and their applications	01	01	01
Total no of Questions		08	08	04

MODEL QUESTION PAPER
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
SIXTH SEMESTER END EXAMINATIONS
III B.Sc., CHEMISTRY VIII-A-1
POLYMER CHEMISTRY

Time: 3 hours

Maximum Marks: 60

PART- A

4 x 8 = 32 Marks

Answer **ALL** the questions. Each carries **EIGHT** marks.
అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి 8 మార్కులు.

1. A) Give an account of classification of polymers.

ఫాలిమర్ ల వర్గీకరణను గూర్చి తెలుపుము

(OR)

- b) Write the mechanism of free radical polymerization.

స్వేచ్ఛా ప్రాతిపదికల ఫోలిమరికరణ చర్యా విధానమును వ్రాయుము.

2. a) How is molecular weight of a polymer determined by viscometry

స్పిగ్గతా మాపనము ద్వారా ఫాలిమర్ ల అణుభారాలను ఎట్లు నిర్ణయిస్తారు?

(OR)

- b) Give an account on bulk and solution polymerization techniques.

బల్క్ మరియు ద్రావణ ఫోలిమరికరణము గూర్చి తెలుపుము.

3. a) Discuss the use of fillers and plasticizers in improving the properties of polymers.

ఫాలిమర్ల ధర్మాలను వృద్ధి చెందించుటలో ఫిల్లర్లు మరియు ప్లాస్టిసైజర్ ల ఉపయోగాలను గూర్చి చర్చించుము.

(OR)

- b) Write notes on flame retardants and cross linking agents.

ఉష్ణ నిరోధకాలు మరియు వ్యత్యస్త ఫాలిమర్ల గూర్చి వ్యాఖ్య వ్రాయుము.

4. a) Discuss the kinetics of free radical polymerization.

స్వేచ్ఛా ప్రాతిపదికల ఫోలిమరికరణము యొక్క గతిశాస్త్రమును చర్చించుము.

(OR)

- b) Write the preparation and industrial applications of polythene and teflon.

ఫాలిథీన్ మరియు టెఫ్లాన్ తయారీ మరియు పరిశ్రమలలో వాటి అనువర్తనాలను వ్రాయుము

PART- B

5 x 4 = 20 Marks

Answer any **FIVE** of the following questions. Each carries **FOUR** marks.

క్రింది వానిలో ఏదేని ఐదు ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి నాలుగు మార్కులు.

5. What are thermo plastics and thermo setting plastics?

థర్మో ప్లాస్టిక్ మరియు థర్మో సెటింగ్ ప్లాస్టిక్ లు అనగానేమి?

6. Write about condensation polymerization.

సంఘనన ఫోలిమరికరణము గూర్చి వ్రాయుము.

7. Define number average and weight average molecular weights.

సంఖ్య సరాసరి మరియు భార సరాసరి అణు భారాలను నిర్వచించుము.

8. Write a note on emulsion polymerization.
ఎమల్షన్ సోలిమరీకరణముపై ఒక వ్యాఖ్య వ్రాయుము.
9. Give the Williams-Landel-Ferry equation.
విలియమ్-లాండెల్-ఫెర్రి సమీకరణమును తెల్పుము.
10. Illustrate the colourants and photosensitizers.
వర్ణకారకాలు మరియు కాంతి స్పందనకారులను సోదాహరణముగా తెల్పుము.
11. What are the factors affecting T_g?
T_g ను ప్రభావితము చేయు అంశాలేవి?
12. Write any two applications of PVC and PAN
PVC మరియు PAN ల ఏవేని రెండు అనువర్తనాలను వ్రాయుము

PART- C

4 x 2 = 8 Marks

Answer ALL the questions Each carries Two marks

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి 2 మార్కులు

1. What is co polymer give example
సహా పాలిమర్ అనగా నేమి
2. What is glass transition temperature?
గాజు పరివర్తన ఉష్ణోగ్రత అనగానేమి?
3. What is nucleating agent? Give example
న్యూక్లియేటింగ్ కారకం అనగా నేమి ఉదాహరణ ఇమ్ము
4. Write the preparation and give one application of nylon-6,6
నైలాన్-6,6 ల తయారీ మరియు పరిశ్రమల లో వాటి అనువర్తనాలను వ్రాయుము.

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Effective from 2017 – 2018 onwards
Paper - VIII-A-2 Semester – VI
INSTRUMENTAL METHODS OF ANALYSIS

UNIT – I

TOTAL HOURS : 45

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).

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.

UNIT – IV

Separation techniques

12 h

Solvent Extraction: Principle and process, Batch extraction, continuous extraction and counter current extraction. Applications, determination of Iron (III).

Chromatography: classification of chromatography methods, principles of differential migration, adsorption phenomenon, nature of adsorbents, solvent systems, stationary and mobile phases R_f values, factors effecting r_f values. Paper Chromatography, principles, experimental procedures, choice of paper, developments of chromatogram, ascending, descending, radial and two dimensional, applications. Thin layer chromatography, advantages, principles, factors effecting R_f values, experimental procedures, preparation of plates, development of the chromatogram, detection of the spots, applications. Column Chromatography, principle and experimental procedure, applications. High Performance Liquid Chromatography & Gas Liquid Chromatography, principles and applications, importance of column technology (packing & capillary), super critical fluids.

UNIT – V

Elemental Analysis:

11 h

Molecular Spectrometry (electrical discharges).

Atomic spectroscopy: Atomic absorption, Atomic emission, and Atomic fluorescence. Excitation and getting sample into gas phase (flames, electrical discharges, plasmas)

NMR spectroscopy: Principle, Instrumentation, Factors affecting chemical shift, spin coupling, Applications.

Electro analytical Methods: Potentiometry & Voltammetry

Radio chemical Methods: X-ray analysis and electron spectroscopy (surface analysis)

REFERENCE BOOKS

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

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III B.SC. CHEMISTRY PAPER VIII-A-2

SEMESTER – VI

INSTRUMENTAL METHODS OF ANALYSIS

Sl. NO.	Chapter	Essay Question (08 M) knowledge	Short Answer Question (05 M) Under standing	Very Short Answer Question (02 M) Skill / Application
1.	Introduction to spectroscopic methods of analysis	02	01	01
2.	Molecular spectroscopy	01	02	--
3.	UV-Visible/ Near IR	02	01	01
4.	Separation techniques	02	02	01
5.	Elemental Analysis	01	02	01
Total no of Questions		08	08	04

MODEL QUESTION PAPER
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
SIXTH SEMESTER END EXAMINATIONS
III B.Sc., CHEMISTRY VIII-A-2
INSTRUMENTAL METHODS OF ANALYSIS

Time: 3 hours

Maximum Marks: 60

PART- A

4 x 8 = 32 Marks

Answer **ALL** the questions. Each carries **EIGHT** marks.

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి ఎనిమిది మార్కులు.

1. a) Write about classification of analytical methods.

విశేషణ పద్ధతుల వర్గీకరణ గూర్చి వ్రాయుము.

(OR)

- b) Explain the classification of errors.

దోషాల వర్గీకరణను వివరించుము.

2. a) Describe the absorption and scattering behaviour of molecules.

అణువుల శోషణ మరియు పరిక్షేపణ ప్రవర్తనను వర్ణించుము.

(OR)

- b) Explain the principle and instrumentation of NMR spectroscopy.

NMR వర్ణ పటశాస్త్రములో ఇమిడి ఉన్న సూత్రాన్ని మరియు పరికర అమరికను వివరించుము.

3. a) Give detailed account on photocells, photo multipliers and diode-array detectors.

కాంతిపుటాలు, కాంతి వర్ణకాలు మరియు డయోడ్-ఎరై లను గూర్చి సంగ్రహముగా తెలుపుము.

(OR)

- b) How do you differentiate absorption and fluorescence?

శోషణము మరియు ప్రతిదిప్తిలను వేరుగా ఎట్లు గుర్తించెదవు?

4. a) Discuss the principle and uses of gas-liquid chromatography.

వాయు-ద్రవ క్రోమాటోగ్రఫీ యొక్క సూత్రము మరియు అనువర్తనాలను గూర్చి చర్చించుము.

(OR)

- b) Explain different solvent extraction methods.

వివిధ ద్రావణ నిష్కర్షణ విధానములను వివరించుము.

PART- B

5 x 4 = 20 Marks

Answer any **FIVE** of the following questions. Each carries **FOUR** marks.

క్రింది వానిలో ఏదేని ఐదు ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి నాలుగు మార్కులు.

5. Explain about significant figures with examples.

ప్రాధాన్యత సంఖ్యలు అనగానేమి? ఉదాహరణలతో వివరించుము.

6. What are the advantages of FTIR?

FTIR యొక్క ఉపయోగాలేవి?

7. Discuss the various techniques of wavelength dispersion.

తరంగదైర్ఘ్య విక్షేపణం యొక్క వేర్వేరు పద్ధతులను గూర్చి చర్చించుము.

8. How double beam instruments are superior to single beam instruments?

ద్విపుంజ వర్ణపటమాపకము, ఏకపుంజ వర్ణపటమాపకము కంటే ఏ విధంగా మెరుగైనది?

9. Briefly explain any two development methods of chromatogram in paper chromatography.

కాగితం క్రోమటోగ్రఫీ లోని ఏవైన రెండు అభివృద్ధి పద్ధతులను క్లుప్తముగా వివరించుము.

10. Describe the procedure for column packing.

స్తంభ సంపుటికరణ విధానమును వర్ణించుము.

11. What are the factors affecting chemical shift?

రసాయన స్థానంతరాన్ని ప్రభావితము చేయు అంశాలు ఏవి?

12. Discuss the principle involved in voltametry.

వోల్టామెట్రీలో ఇమిడియున్న సూత్రాన్ని చర్చించుము.

PART- C

4 x 2 = 8 Marks

Answer ALL the questions. Each carries TWO marks.

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతీ దానికి రెండు మార్కులు.

13. Define accuracy and precision?

ఖచ్చితత్వం మరియు సునిశితత్వం నిర్వచించండి

14. What is the principle involved in U.V Spectroscopy?

U.V Spectroscopy నందు ఇమిడి వున్న సూత్రం ఏమిటి

15. What are the factors affecting R_f values

R_f విలువలను ప్రభావితం చేసే అంశాలు ఏమిటి

16. What is Chemical Shift?

రసాయన స్థానభ్రంశం అనగా నేమి?

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Paper - VIII-A-3 Semester – VI
ANALYSIS OF DRUGS, FOOD PRODUCTS & BIO-CHEMICAL ANALYSIS

TOTAL HOURS : 45

Unit – I **8h**

Drugs-I: Introduction - Drug & disease (definition) -Sources - Plant Animal & synthetic. - Terminology - Pharmacy - Pharmacology – Pharmacophore - Pharmacodynamics - Pharmacokinetics (ADME, Receptors – brief treatment) - Metabolites and Anti metabolites.

Unit – II **8h**

Drugs-II: 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 **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 anti malarials like chloroquine.

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

Anti tuberculous drug- isoniazid.

UNIT - IV **10 h**

Food Adulteration Determination of Food Adulteration, Determination of Moisture, Ash, Crude fat or ether-extract, Soluble extractor, Crude protein, True protein, Crude fiber, Starch, Analysis of Sugars (Carbohydrate), Estimation of Sucrose in a given sample of cane sugar, Determination of Phosphorous in plant or food material, Destruction of organic matter, Important points, Determination of total Na, K, Ca and Mg in food materials by flame photometry.

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.

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**III B.SC. CHEMISTRY PAPER VIII-A-3
SEMESTER – VI**

ANALYSIS OF DRUGS, FOODS, DAIRY PRODUCTS & BIO-CHEMICAL ANALYSIS

Sl. NO.	Chapter	Essay Question (08 M) knowledge	Short Answer Question (05 M) Under standing	Very Short Answer Question (02 M) Skill / Application
1.	Drugs-I : Introduction	02	01	01
2.	Drugs-II : Nomenclature	01	02	01
3.	Analysis of the following drugs and pharmaceuticals preparations	02	02	01
4.	Drugs-IV	02	01	01
5.	Clinical analysis of blood	01	02	--
Total no of Questions		08	08	04

MODEL QUESTIONPAPER
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
SIXTH SEMESTER END EXAMINATIONS
III B.Sc., CHEMISTRY - PAPER VIII- A - 3
ANALYSIS OF DRUGS, FOODS, DAIRY PRODUCTS & BIO-CHEMICAL ANALYSIS

Time: 3 hours

Maximum Marks: 60

PART- A

4 x 8 = 32 Marks

Answer **ALL** the questions. Each carries **EIGHT** marks.

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి 8 మార్కులు.

- 1) a) Give a detailed account on pharmacodynamics and pharmacokinetics.
ఫార్మాకోడైనమిక్స్ మరియు ఫార్మాకోకైనటిక్స్ గూర్చి విపులముగా తెల్పుము.

(OR)

- b) Explain the following terms with suitable examples.

i) Metabolites ii) Anti-metabolites

ఈ క్రింది పదాలను తగిన ఉదాహరణలతో వివరించుము.

i) మెటబొలైట్స్ ii) ఆంటి మెటబొలైట్స్

- 2) a) Discuss the classification of drugs based on therapeutic activity.
ఔషధ క్రియాశీలత ఆధారంగా ఔషధాల వర్గీకరణను గూర్చి చర్చించుము.

(OR)

- b) Give in detail the estimation of cholesterol and glucose of blood.

రక్తములోని కొలెస్ట్రాల్ మరియు గ్లూకోజ్ ను నిర్ణయించు పద్ధతులను గూర్చి సంగ్రహముగా తెల్పుము.

- 3) a) How do you prepare and analyze chloroquine?
క్లోరోక్విన్ ను ఏ విధంగా తయారుచేసి విశ్లేషణ చేయుదువు?

- b) How do you prepare and analyze aspirin?

ఆస్పిర్న్ ను ఏ విధంగా తయారుచేసి విశ్లేషణ చేయుదువు?

- 4) a) Determine the Na, K, Ca and Mg in food materials by flame photometry.

(OR)

- b) Estimation of Sucrose in a given sample of cane sugar,

PART- B

5 x 4 = 20 Marks

Answer any **FIVE** of the following questions. Each carries **FOUR** marks.

క్రింది వానిలో ఏదేని ఐదు ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి నాలుగు మార్కులు.

- 1) What are Pharmaco dynamics Drugs?

ఫార్మాకో డైనమిక్ డ్రగ్స్ అనగానేమి?

- 2) Write the nomenclature of drugs with suitable examples.
తగిన ఉదాహరణలు తో ఔషధముల నామకరణమును తెలుపండి.
- 3) Analysis of penicillin in the treatment of infections and infestations
- 4) Determine the crude protein and starch in a food sample
- 5) What are the trace elements present in the body?
శరీరంలో వుండు సూక్ష్మమూలకాలు ఏవి?
- 6) Describe the types of administration of drugs.
ఔషధ సేవనము యొక్క వివిధ రకాలను వర్ణించుము
- 7) Give the synthesis and theoretic activity of paracetamol
పారాసెటమాల్ యొక్క ఔషధ క్రియాశీలత గూర్చి వ్రాయుము
- 8) Write a short note on composition of blood.
రక్తము యొక్క సంఘటనము గూర్చి వ్రాయుము.

PART- C

4 x 2 = 8 Marks

Answer **ALL** the questions. Each carries **TWO** marks.

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి రెండు మార్కులు.

- 1) Define pharmacophore give example
ఫార్మాకోఫోర్ మరియు పదాల నిర్వచించుము
- 2) Give clinical and generic name of aspirin
అస్పిరిన్ యొక్క క్లినికల్ మరియు సాధారణ నామాలను రాయండి?
- 3) Define analgesics and antipyretics. Give examples
బాధా నివారిణులు మరియు జ్వర నివారిణులను నిర్వచించుము.
- 4) What is true protein?
నిజ ప్రోటీన్ అనగా నేమి

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Paper - VIII-B-1 Semester – VI

FUEL CHEMISTRY AND BATTERIES

Total Hours : 45

UNIT –I

12 h

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 and solvent refining.

UNIT-II

6 h

Petroleum and petrol chemical industry:

Composition of crude petroleum, refining and different types of petroleum products and their applications.

UNIT-III

10 h

Fractional distillation (principle and process), cracking (Thermal and catalytic cracking). Reforming petroleum and non-petroleum fuels (LPG, CNG, LNG, bio-gas), fuels derived from biomass, fuel from waste, synthetic fuels (gaseous and liquids), clear fuels, petro chemicals: vinyl acetate, propylene oxide, isoprene, butadiene, toluene and its derivative xylene.

UNIT-IV

10 h

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

7 h

Batteries

Primary and secondary batteries, battery components and their role, Characteristics of battery. Working of following batteries: Pb-Acid, Li-Battery, Solid state electrolyte battery. Fuel cells, Solar cell and polymer cell.

REFERENCE BOOKS

1. E.Stochi : 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.

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III B.SC. CHEMISTRY CLUSTER – VIII B-I

SEMESTER – VI

FUEL CHEMISTRY AND BATTERIES

Sl. NO.	Chapter	Essay Question (08 M) knowledge	Short Answer Question (04 M) Under standing	Very Short Answer Question (02 M) Skill / Application
1.	UNIT –I	02	02	00
2.	UNIT –II	02	01	01
3.	UNIT –III	02	02	00
4.	UNIT –IV	02	01	01
5.	UNIT –V	00	02	02
Total no of Questions		08	08	04

MODEL QUESTIONPAPER
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
SIXTH SEMESTER END EXAMINATIONS
III B.Sc., CHEMISTRY - PAPER VIII- B - 1
FUEL CHEMISTRY AND BATTERIES

Maximum Marks: 60

Time: 3 hours

SECTION-A

4 x 8 = 32 Marks

Answer **ALL** the questions. Each carries **Eight** marks.

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి ఎనిమిది మార్కులు.

1. A) Write in detail about renewable and non-renewable energy sources.

పునరుద్ధింపబడు మరియు పునరుద్ధింపలేని శక్తి వనరులను గూర్చి సంగ్రహముగా వ్రాయుము.

(OR)

- B) Write about the composition and uses of producer gas and water gas.

ప్రోడ్యూసర్ గ్యాస్ మరియు వాటర్ గ్యాస్ ల సంఘటనమును మరియు ఉపయోగాలను వ్రాయుము.

2. A) Explain the composition of the crude petroleum.

ముడి చమురు సంఘటనమును వివరించుము.

(OR)

- B) Describe the refining of petroleum.

పెట్రోలియంను శుద్ధి చేయుటను వర్ణించుము.

3. A) Discuss about fractional distillation.

అంశిక స్వేదన ప్రక్రియ గూర్చి చర్చించుము.

(OR)

- B) Write about the non-petroleum fuels.

పెట్రోలియంమేతర ఇంధనాల గూర్చి వ్రాయుము.

4. A) Explain the classification of lubricants.

కందెనల వర్గీకరణను వివరింపుము.

(OR)

- B) What are the properties of lubricants?

కందెనల ధర్మాలేవి?

SECTION-B

5 x 4 = 20 Marks

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

క్రింది వానిలో ఏదేని ఐదు ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి నాలుగు మార్కులు.

5. What are the uses of coal in various industries?
వివిధ పరిశ్రమలలో బొగ్గు యొక్క ఉపయోగాలను వ్రాయుము.
6. Discuss the gasification of coal.
బొగ్గును వాయువికరించు విధానమును గూర్చి చర్చించుము.
7. Write the applications of different petroleum products.
వివిధ పెట్రోలియం ఉత్పత్తుల యొక్క అనువర్తనాలను వ్రాయుము
8. Short note on cracking.
భంజనముపై లఘువ్యాఖ్య.
9. Write about synthetic fuels.
కృత్రిమ ఇంధనాలు గూర్చి వ్రాయుము.
10. What are conducting and non-conducting lubricating oils?
వాహక, అవాహక కందెన నూనెలు అనగానేమి?
11. Fuel cells.
ఇంధన ఘటములు
12. Write about the primary and secondary batteries.
ప్రాథమిక మరియు ద్వితీయ బ్యాటరీలను గూర్చి వ్రాయుము.

SECTION-C

4 x 2 = 8 Marks

Answer **ALL** the questions. Each carries **two** marks.
అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి రెండు మార్కులు.

13. What is carbonisation of coal?
బొగ్గు కర్బనికరణ అనగా ఏమి?
14. What are conducting lubricants?
వాహక కందెనలు అనగా ఏమి?
15. Write about polymer cell.
ఫోలిమర్ ఘటము గూర్చి వ్రాయండి
16. Write about the working of the Li-Battery
Li-బ్యాటరీ పని తీరు గూర్చి వ్రాయండి

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
DEPARTMENT OF CHEMISTRY
CBCS Syllabus for B.Sc. III Year
Effective from 2018 – 2019 onwards
Paper - VIII-B-2 Semester – VI

INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

No. of h/w : 3h

UNIT-I

Recapitulation of *s*- and *p*-Block Elements

8 h

Periodicity in *s*- and *p*-block elements with respect to electronic configuration, atomic and ionic size, ionization enthalpy, electronegativity (Pauling, Mulliken and Alfred - Rochow scales). Allotropy in C, S, and P. Oxidation states with reference to elements in unusual and rare oxidation states like carbides and nitrides), inert pair effect, diagonal relationship and anomalous behaviour of first member of each group.

UNIT – II

15 h

Silicate Industries

Glass: Glassy state and its properties, classification (silicate and non-silicate glasses). Manufacture and processing of glass. Composition and properties of the following types of glasses: Soda lime glass, lead glass, armoured glass, safety glass, borosilicate glass, fluorosilicate, coloured glass, photosensitive glass.

Ceramics: Important clays and feldspar, ceramic, their types and manufacture. High technology ceramics and their applications, superconducting and semiconducting oxides, fullerenes, carbon nanotubes and carbon fibre.

Cements: Classification of cement, ingredients and their role, Manufacture of cement and the setting process, quick setting cements.

UNIT – III

8 h

Fertilizers:

Different types of fertilizers. Manufacture of the following fertilizers: Urea, ammonium nitrate, calcium ammonium nitrate, ammonium phosphate, polyphosphate, superphosphate, compound and mixed fertilizers, potassium chloride, potassium sulphate.

UNIT – IV

8 h

Surface Coatings:

Objectives of coatings surfaces, preliminary treatment of surface, classification of surface coatings. Paints and pigments-formulation, composition and related properties. Oil paint, Vehicle, modified oils, Pigments, toners and lakes pigments, Fillers, Thinners, Enamels, emulsifying agents. Special paints (Heat retardant, Fire retardant, Eco-friendly paint, Plastic paint), Dyes, Wax polishing, Water and Oil paints, additives, Metallic coatings (electrolytic and electroless), metal spraying and anodizing.

UNIT – V

6 h

Alloys:

Classification of alloys, ferrous and non-ferrous alloys, Specific properties of elements in alloys. Manufacture of steel (removal of silicon decarbonization, demanganization, desulphurization, dephosphorisation) and surface treatment (argon treatment, heat treatment, nitriding, carburizing). Composition and properties of different types of steels.

Chemical explosives:

Origin of explosive properties in organic compounds, preparation and explosive properties of lead azide, PETN, cyclonite (RDX). Introduction to rocket propellants.

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.
7. B. K. Sharma: Engineering Chemistry, Goel Publishing House, Meerut.

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III B.SC. CHEMISTRY CLUSTER – VIII B-2

SEMESTER – VI

INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

Sl. NO.	Chapter	Essay Question (08 M) knowledge	Short Answer Question (04 M) Under standing	Very Short Answer Question (02 M) Skill / Application
1.	UNIT –I	02	01	01
2.	UNIT –II	02	02	00
3.	UNIT –III	02	01	01
4.	UNIT –IV	00	02	02
5.	UNIT –V	02	02	00
Total no of Questions		08	08	04

MODEL QUESTIONPAPER
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
SIXTH SEMESTER END EXAMINATIONS
III B.Sc., CHEMISTRY - PAPER VIII- B - 2
INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

Time: 3 hours
Maximum Marks: 60

SECTION- A

4 x 8 = 32 Marks

Answer **ALL** the questions. Each question carries **eight** marks.

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి ప్రశ్నకు ఎనిమిది మార్కులు.

1. A) Discuss the unusual oxidation states of carbon and nitrogen.

కార్బన్ మరియు నైట్రోజన్ ల యొక్క అసాధారణ ఆక్సీకరణ స్థితులను గూర్చి చర్చించుము.

(OR)

- B) Describe the anomalous behaviour of lithium and boron.

లిథియం మరియు బోరాన్ అసాధారణ ప్రవర్తనను వర్ణించుము.

2. A) Give the composition and properties of coloured glass and photosensitized glass.

వర్ణపూరిత గాజు మరియు కాంతి స్పందన గాజుల యొక్క సంఘటనము మరియు ధర్మాలను

తెలుపుము.

(OR)

- B) Explain the manufacturing of cement and its setting process.

సిమెంట్ యొక్క తయారీ మరియు దాని సెటింగ్ ప్రక్రియను వివరించుము.

3. A) Write about the manufacturing of any two nitrogen fertilizers.

ఏవేని రెండు నైట్రోజన్ ఎరువుల తయారీని వ్రాయుము .

(OR)

- B) Write about the manufacturing of any two phosphorous fertilizers.

ఏవేని రెండు ఫోస్ఫోరస్ ఎరువుల తయారీని వ్రాయుము.

4. A) Give the process of manufacturing of steel.

స్టీల్ ను తయారు చేయు విధానమును వ్రాయుము.

(OR)

- B) Write the preparation and explosive properties of RDX.

RDX యొక్క తయారీ మరియు విస్ఫోటన ధర్మాలను వ్రాయుము.

SECTION- B

5 x 4 = 20 Marks

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

క్రింది వానిలో ఏదేని ఐదు ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి నాలుగు మార్కులు.

5. Write about diagonal relationship.

కర్ణసంబంధమును గూర్చి వ్రాయుము.

6. Discuss the classification of glasses.

గాజుల వర్గీకరణను గూర్చి చర్చించుము.

7. Write about Carbon nanotubes
కార్బన్ నానో గొట్టాలు గూర్చి వ్రాయండి
8. Describe the manufacturing of urea.
యూరియా తయారీ విధానమును వర్ణించుము.
9. What are emulsifying agents? Give examples.
ఎమల్సికరణ కారకాలు అనగానేమి? ఉదాహరణ నిమ్ము.
10. Explain about metallic coatings.
లోహపు పూతలను గూర్చి వివరించుము.
11. Write a note on non-ferrous alloys.
నాన్ ఫెర్రస్ మిశ్రమలోహాలను గూర్చి వ్రాయుము.
12. Explain the properties of steels.
స్టీల్ ల ధర్మాలను వివరింపుము.

SECTION- C

4 x 2 = 8 Marks

Answer **ALL** the questions. Each carries **two** marks.
అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి రెండు మార్కులు.

13. What are allotropes of carbon?
కార్బన్ రూపాంతరాలు ఏమిటి?
14. What are NPK fertilizers?
NPK- ఎరువులు అంటే ఏమిటి
15. What are enamel paints?
ఎనామిల్ పెయింట్ లు అంటే ఏమిటి?
16. Write an example for eco-friendly paint.
పర్యావరణ హిత పెయింట్లకు ఉదాహరణలు రాయండి.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
DEPARTMENT OF CHEMISTRY
CBCS Syllabus for B.Sc. III Year
Effective from 2018 – 2019 onwards
Paper - VIII-B-3 Semester – VI
ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS

No. of h/w: 3h
9 h

UNIT-I

Analysis of soaps: moisture and volatile matter, combined alkali, total fatty matter, free alkali, total fatty acid, sodium silicate and chlorides.

Analysis of paints : Vehicle and pigments, Barium Sulphate, total lead, lead chromate, iron pigments, zinc chromate.

UNIT-II

8 h

Analysis of oils: saponification value, iodine value, acid value, ester value, bromine value, acetyl value. Analysis of industrial solvents like benzene, acetone, methanol and acetic acid, Determination of methoxy and N-methyl groups.

UNIT-III

10 h

Analysis of fertilizers: urea, NPK fertilizer, superphosphate. Analysis of DDT, BHC, endrin, endosulfone, malathion, parathion. Analysis of starch, sugars, cellulose and paper.

UNIT-IV

9 h

Gas analysis: carbon dioxide, carbon monoxide, oxygen, hydrogen, saturated hydrocarbons, unsaturated hydrocarbons, nitrogen, octane number, cetane number.

Analysis of fuel gases like: water gas, producer gas, kerosene (oil) gas.

Ultimate analysis: carbon, hydrogen, nitrogen, oxygen, phosphorus and sulphur.

UNIT-V

9 h

Analysis of Complex materials:

Analysis of cement- loss on ignition, insoluble residue, total silica, sesqui oxides, lime, magnesia, ferric oxide, sulphuric anhydride.

Analysis of glasses- Determination of silica, sulphur, barium, arsenic, antimony, total R_2O_3 , calcium, magnesium, total alkalies, aluminium, chloride, fluoride.

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 Nostrand Co.
4. F.D. Snell & F.M. Biffen - Commercial methods of analysis - D.B. Tarapuravala & 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 - Analytical Agricultural Chemistry - Kalyani Publishers.
8. R.M. Upadhyay and N.L. Sharma - Manual of soil, plant, water and fertilizer analysis - Kalyani Publishers.

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III B.SC.CHEMISTRY CLUSTER – VIII B-3

SEMESTER – VI

ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS

Sl. NO.	Chapter	Essay Question (08 M) knowledge	Short Answer Question (04 M) Under standing	Very Short Answer Question (02 M) Skill / Application
1.	UNIT-I	02	02	00
2.	UNIT-II	02	01	00
3.	UNIT-III	02	01	01
4.	UNIT-IV	02	02	01
5.	UNIT-V	00	02	02
Total no of Questions		08	08	04

MODEL QUESTIONPAPER
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
SIXTH SEMESTER END EXAMINATIONS
III B.Sc., CHEMISTRY - PAPER VIII- B - 3
ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS

Time: 3 hours
Max. Marks: 60

PART-A

Answer **ALL** the questions. Each carries **Eight** marks.

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి ఎనిమిది మార్కులు.

4 x8 =32 Marks

1. a) How do you analyze lead chromate and zinc chromate present in paints?

పెయింట్ లలోని లెడ్ క్రోమేట్ మరియు జింక్ క్రోమేట్ లను ఎట్లు విశ్లేషించెదరు?

(OR)

b) How do you determine the total fatty matter and free alkali of soaps?

సబ్బులలోని క్రోవు పదార్థము మరియు స్వేచ్ఛా క్షారములను ఎట్లు నిర్ణయించెదరు?

2. a) Give the procedure for the determination of iodine value and acid value in oil samples.
నూనె నమూనాలలోని అయోడిన్ విలువ మరియు ఆమ్ల విలువలను నిర్ణయించు పద్ధతులను తెల్పుము.

(OR)

b) Describe the analysis of benzene.

బెంజిన్ యొక్క విశ్లేషణను వర్ణించుము.

3. a) Discuss the analysis of urea and DDT.

యూరియా మరియు DDT ల విశ్లేషణను చర్చించుము

(OR)

b) Discuss the analysis of starch and paper.

స్టార్చ్ మరియు కాగితం యొక్క విశ్లేషణను చర్చించుము.

4. a) Write about octane number and cetane number.

ఆక్టేన్ సంఖ్య మరియు సీటేన్ సంఖ్యలను గూర్చి వ్రాయుము.

(OR)

b) How are water gas and producer gas analyzed?

ప్రోడ్యూసర్ గ్యాస్ మరియు వాటర్ గ్యాస్ లను ఎలా విశ్లేషిస్తారు?

PART-B

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

5x4 =20 Marks

క్రింది వానిలో ఏదేని ఐదు ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి నాలుగు మార్కులు.

5. How do you determine the moisture in soaps?

సబ్బులలోని తేమను ఎలా నిర్ణయిస్తారు?

6. Give the procedure for the determination of total lead in paints.

పెయింట్ లలోని మొత్తం లెడ్ ను నిర్ణయించు విధానము నిమ్ము.

7. Write a note on saponification value.

సపానిఫికేషన్ విలువపై వ్యాఖ్య వ్రాయుము.

8. Explain the analysis of BHC.

BHC యొక్క విశ్లేషణను వివరించుము.

9. How carbon monoxide is analysed in gases?

వాయువులలోని కార్బన్ మోనాక్సైడ్ ను ఎట్లు విశ్లేషిస్తారు?

10. Explain the determination process of nitrogen in gases.

వాయువులలోని నైట్రోజన్ ను నిర్ణయించు విధానమును వివరించుము.

11. Describe the determination of lime in cement.

సిమెంట్ లోని లైమ్ ను నిర్ణయించడాన్ని వర్ణించుము.

12. Describe the determination of silica in glass.

గాజులోని సిలికాను నిర్ణయించుటను వర్ణించుము.

PART-C

Answer **ALL** the questions. Each carries **Two** marks.

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి రెండు మార్కులు.

4 x2 =8 Marks

13. What is NPK fertilizer?

NPK ఎరువులు అనగా ఏమి?

14. What is kerosene oil gas?

కిరోసిన్ ఆయిల్ అనగా ఏమిటి?

15. What is insoluble residue?

కరగని అవశేషాలు అనగా ఏమిటి?

16. What is meant by total silica?

మొత్తం సిలికా అంటే ఏమిటి?

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM

DEPARTMENT OF CHEMISTRY

III B.Sc. SEMESTER – VI PAPER – VIII C1

(Effective from 2017 – 2018 onwards)

Paper - VIII-C-1 - ORGANIC SPECTROSCOPIC TECHNIQUES

Total No. of Hrs: 45

UNIT-I 10 h

Nuclear Magnetic Resonance Spectroscopy- I

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. Vicinal, Geminal and Long range coupling - Factors influencing coupling constants.

UNIT – II 5 h

Nuclear Magnetic Resonance Spectroscopy- II

Spin decoupling, Spin tickling, Deuterium exchange, Chemical shift reagents and Nuclear Overhauser effect. Applications in Medical diagnostics, Reaction kinetics and mechanically induced dynamic nuclear polarization. FT NMR and its advantages.

UNIT-III 10 h

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, trines 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, NO₂⁻, Pb⁺²). Simultaneous determination of Chromium and Manganese in a mixture.

UNIT-V 15 h

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 hyper fine splitting coupling constants. Line width, Zero field splitting and Kramer degeneracy. Crystal field splitting, Crystal field effects.

Applications:- Detection of free radicals - ESR spectra of Methyl radical (CH_3^\cdot), Benzene anion (C_6H_6^-), Isoquinine, $[\text{Cu}(\text{H}_2\text{O})_6]^{+2}$ and $[\text{Fe}(\text{CN})_5\text{NO}]^{-3}$

Additional Information @ Intellectual Property Rights

UNIT I

Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics – Types of Intellectual Property – Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement – Regulatory – Over use or Misuse of Intellectual Property Rights – Compliance and Liability Issues.

UNIT II

Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works – Rights of Distribution – Rights of performers – Copyright Formalities and Registration – Limitations – Infringement of Copyright – International Copyright Law Semiconductor Chip Protection Act.

UNIT III

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting – Patent Searching – Patent Cooperation Treaty – New developments in Patent Law- Invention Developers and Promoters.

UNIT IV

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Inter parties Proceedings – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law.

REFERENCE BOOKS

5. Analytical Chemistry by Skoog and Miller
6. A textbook of qualitative inorganic analysis by A.I. Vogel
7. Nanochemistry by Geoffrey Ozin and Andre Arsenault
8. Stereochemistry by D. Nasipuri
10. Organic Chemistry by Clayden
11. Deborah E. Bouchoux: "Intellectual Property". Cengage learning, New Delhi
12. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
13. Prabhuddha Ganguli: 'Intellectual Property Rights' Tata Mc-Graw – Hill, New Delhi
14. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM.

BLUE PRINT

**III B.SC. CHEMISTRY PAPER VIII-C-1
SEMESTER – VI**

ORGANIC SPECTROSCOPIC TECHNIQUES

Sl. NO.	Chapter	Essay Question (08 M) knowledge	Short Answer Question (05 M) Under standing	Very Short Answer Question (02 M) Skill / Application
1.	UNIT-I	01	02	01
2.	UNIT-II	01	02	--
3.	UNIT-III	02	02	01
4.	UNIT-IV	02	01	01
5.	UNIT-V	02	01	01
Total no of Questions		08	08	04

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM

SIXTH SEMESTER END EXAMINATIONS

III B.Sc., CHEMISTRY - PAPER VIII- C - 1

ORGANIC SPECTROSCOPIC TECHNIQUES

MODEL QUESTIONPAPER

Time: 3 hours

Maximum Marks: 60

PART- A

4 x 8 = 32 Marks

Answer **ALL** the questions. Each carries **EIGHT** marks.

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి ఎనిమిది మార్కులు.

a) i) What is the principle of NMR spectroscopy.

1. NMR వర్ణపటశాస్త్రములో ఇమిడి ఉన్న సూత్రమును వ్రాయుము.

ii) Define chemical shift. What are the factors influencing chemical shift?

రసాయన స్థానాంతరీకరణమును నిర్వచించుము. రసాయన స్థానాంతరీకరణమును

ప్రభావితము చేయు అంశాలేవి?

(OR)

b) What is FTNMR? What are the advantages of it?

FTNMR అనగానేమి? దాని ప్రయోజనాలేవి

2. a) Write about Born-oppenheimer approximation.

బోర్న్-ఓపెన్ హేమర్ ఉజ్జాయింపు గూర్చి వ్రాయుము.

(OR)

b) What are the Woodward-Fieser rules of UV-Visible spectroscopy?

అతినీలలోహిత-దృశ్యోచర వర్ణపటశాస్త్రములోని ఉడ్వూర్డ్-ఫీజర్ నియమాలు ఏమి?

3. a) How is Beer-Lambert's law useful in quantitative determination of **Mn(II)** and **Fe(II)**?

Mn(II) మరియు **Fe(II)** లను పరిమాణాత్మకంగా నిర్ణయించుటలో బీర్-లాంబర్ట్ నియమము ఎట్లు

ఉపయోగపడును?

(OR)

b) Give the experimental procedure of simultaneous determination of chromium and manganese in a mixture using Beer-Lambert's law.

క్రోమియం మరియు మాంగనీసు లను బీర్-లాంబర్ట్ నియమము ఉపయోగించి ఒకేసారి నిర్ణయించు

ప్రయోగ పద్ధతిని తెల్పుము.

4. a) Explain the principle and experimental techniques involved in ESR studies.

ESR అధ్యయనంలో ఇమిడిఉన్న సూత్రము మరియు ప్రయోగ పద్ధతిని వివరించుము

(OR)

b) Write notes on 'g' value and hyperfine structure.

'g' విలువ మరియు హైపర్ ఫైన్ నిర్మాణము గూర్చి వ్యాఖ్య వ్రాయుము.

PART- B

5 x 4 = 20 Marks

Answer any **FIVE** of the following questions. Each carries **FOUR** marks.

క్రింది వానిలో ఏదేని ఐదు ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి నాలుగు మార్కులు.

5. Write about spin-spin relaxation.

స్పిన్-స్పిన్ రిలాక్సేషన్ గూర్చి వ్రాయుము.

6. Describe the factors influencing the coupling constant.

యుగళీకరణ స్థిరాంకమును ప్రభావితము చేయు అంశాలను వర్ణించుము.

7. Explain about spin decoupling.

స్పిన్ డికప్లింగ్ ను వివరింపుము.

8. What are the applications of NMR spectroscopy in medical diagnostics?

వ్యాధి నిర్ధారణలో NMR వర్ణపటశాస్త్రము యొక్క అనువర్తనాలేవి?

9. Write about Franck-Condon principle.

ఫ్రాంక్-కాండన్ సూత్రమును గూర్చి వ్రాయుము.

10. What are the different types of electronic transitions?

వివిధ రకాల ఎలక్ట్రానిక్ పరివర్తనాలు ఏమి?

11. State and explain Beer-Lambert law.

బీర్-లాంబర్ట్ నియమమును తెల్పి, వివరింపుము

12. How ESR studies are useful to study the structure of free radicals?

స్వేచ్ఛా ప్రతిపాదికల నిర్మాణాన్ని అధ్యయనం చేయుటలో ESR ఎట్లు ఉపయోగపడును?

PART- C

4 x 2 = 8 marks

Answer All Questions Each Carry TWO Marks

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి రెండు మార్కులు.

13. What is coupling constant?

యుగళీకరణ స్థిరాంకము అనగా నేమి?

14. Define Chromophores and Auxochrome.

క్రోమోఫోర్ మరియు ఆగ్లోక్రోమే లను నిర్వచించండి

15. What is molar extinction coefficient?

మోలార్ విలుప్తత గుణకం అనగా నేమి

16. Write any two similarities between NMR&ESR

NMR&ESR మధ్య రెండు పోలికలను రాయండి

GOVERNMENT COLLEGE (A) RAJAMAHENDRAVARAM

DEPARTMENT OF CHEMISTRY

III B.Sc. – SEMESTER – VI PAPER – VII C2

(Effective from 2017 – 2018 onwards)

Paper - VIII-C-2 - ADVANCED ORGANIC REACTIONS

Total Hours: 45

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) Photo reduction, mechanism, influence of temperature, solvent, nature of hydrogen donors, structure of substrates on the course of photo reduction.

UNIT – II

Organic 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, Photochemistry of conjugated dienes, Decomposition of nitrites - Barton reaction.

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, benzoylation, benzyloxy carbonyl, triphenyl methyl groups and fmoc, (5) Protection of carbonyl groups – acetal, ketal, 1,2–glycols and 1,2–dithioglycols 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 - mechanisms and use of benzyl trialkyl ammonium halides. Wittig reaction.

UNIT – V :

New Synthetic Reactions

12 h

Baylis–Hillman reaction, RCM olefm metathesis, Grubb catalyst, Mukayama aldol reaction, Mitsunobu reaction, McMurrey reaction, Julia–Lythgoe olefination, and Peterson's stereoselective olefination, Heck reaction, Suzuki coupling, Stille coupling and Sonogishira 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.

MODEL QUESTION PAPER
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
SIXTH SEMESTER END EXAMINATIONS
III B.Sc., CHEMISTRY - PAPER VIII- C -2
ADVANCED ORGANIC REACTIONS

Time: 3 hours

Maximum Marks: 60

PART- A

4 x 8 = 32 Marks

Answer all questions.

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము.

1) a) What is photo reduction? How it is affected by temperature and solvent?

కాంతి క్షయకరణము అనగానేమి? ఉష్ణోగ్రత మరియు ద్రావణి చేత ఇది ఎట్లు ప్రభావితమగును?

(OR)

b) Explain the following:

i) Singlet and triplet states ii) Jablonski diagram

ఈక్రింది వాటి గూర్చి వివరించుము.

i) ఏకక మరియు త్రిక స్థితులు ii) జబ్లాంస్కీ చిత్రము

2) a) Discuss the Norrish type-I cleavage with an example.

నారిష్ టైప్- I విచ్ఛిత్తిని ఒక ఉదాహరణతో చర్చించుము

(OR)

b) What do you know about the following:

i) Di- π methane rearrangement ii) Barton reaction

ఈక్రింది వాటి గూర్చి నీకు ఏమి తెలియును?

i) Di- π మీథేన్ పునరమరిక ii) బార్టన్ చర్య

3) a) Give a detailed account on the protection of carbonyl groups.

కార్బనైల్ సమూహమును రక్షించుట గూర్చి సంగ్రహముగా తెల్పుము.

(OR)

b) How amine group is protected by acylation and benzylation.

ఎమీన్ సమూహము ఎసైలేషన్ మరియు బెంజైలేషన్ ద్వారా ఎట్లు రక్షించబడును?

4) a) Write note on the following:

a. Mannich reaction ii) Wittig reaction

ఈ క్రింది వాటి పై వ్యాఖ్య వ్రాయుము.

i) మానిచ్ చర్య ii) విట్టిగ్ చర్య

(OR)

b) Write a note on the following:

i) Umpolung ii) Phase transfer catalysis

SECTION - B

5x4 = 20 Marks

Answer any five questions.

1. Write notes on inter-system crossing.

అంతర వ్యవస్థ వ్యత్యస్థత గూర్చి వ్యాఖ్య వ్రాయుము.

2. Describe the photochemistry of benzene.

బెంజీన్ యొక్క కాంతి రసాయన శాస్త్రమును వర్ణించుము.

3. Give a brief account on the protection of carboxylic acids by ester formation.

కార్బాక్సీలిక్ ఆమ్లమును ఎస్టర్ గా మార్చుట ద్వారా రక్షించుట గూర్చి క్లుప్తంగా వ్రాయుము

4. How does carbonate formation protect diols?

కార్బనేట్ ఏర్పడుట ద్వారా డైఓల్స్ ఎట్లు రక్షింపబడును?

5. Write about Robinson annulation.

రాబిన్ సన్ అన్యూలేషన్ గూర్చి వ్రాయుము

6. What is Stork-enamine reaction?

స్టోర్క్-ఈనమీన్ చర్య అనగానేమి?

7) Explain the Mukayama aldol reaction.

ముకయామా-అల్డల్ చర్యను వివరింపుము.

8) Discuss about Ugi reaction.

యుగి చర్యను చర్చించుము.

PART- C

4 x 2= 8 Marks

Answer **all** the questions..

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము.

1) What is meant by Phase Transfer Catalysis

ప్రావస్థా బదిలీ ఉత్ప్రేరణము.

2) Explain Heck reaction.

హక్ చర్య ను వివరించుము.

3) Write about protection of Diols.

డయోలుల రక్షణ గూర్చి వ్రాయుము.

4) What is meant by photo reduction.

ఫోటో రిడక్షన్ అనగానేమి?

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
DEPARTMENT OF CHEMISTRY
CBCS Syllabus for B.Sc. III Year
Effective from 2017 – 2018 onwards
Paper - VIII-C-3 Semester – VI
PHARMACEUTICAL AND MEDICINAL CHEMISTRY

No. of h/w : 3

UNIT-I

8 h

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

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. Sulphadruugs(Sulphamethoxazole) 2. Antibiotics - β -Lactam Antibiotics, Macrolide Antibiotics, 3. Anti malarial Drugs(chloroquine)

b. Psycho therapeutic Drugs:

1. Anti pyretics(Paracetamol) 2. Hypnotics 3. Tranquilizers(Diazepam) 4. Levodopa

UNIT-IV

Pharmacodynamic Drugs:

8 h

1. Antiasthma Drugs (Solbutamol) 2. Antianginals (Glycerol Trinitrate)
3. Diuretics(Frusemide)

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 by Ashutoshkar
4. Medicinal Chemistry by P.Parimoo
5. Pharmacology & Pharmacotherapeutics R.S Satoshkar & S.D.Bhandenkar
6. Medicinal Chemistry by Kadametal P-I & P-II
7. European Pharmacopoeia

MODEL QUESTION PAPER
GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
SIXTH SEMESTER END EXAMINATIONS
III B.Sc., CHEMISTRY - PAPER VIII- C - 3
PHARMACEUTICAL & MEDICINAL CHEMISTRY

Time: 3 hours

Maximum Marks: 60

PART- A

4 x 8 = 32 Marks

Answer **ALL** the questions. Each carries **TEN** marks.

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతి దానికి పది మార్కులు.

1. a) Give a detailed account on pharmacodynamics and pharmacokinetics.

ఫార్మకోడైనమిక్స్ మరియు ఫార్మకోకైనెటిక్స్ గూర్చి విపులముగా తెల్పుము.

(OR)

- b) Explain the following terms with suitable examples.

i) Metabolites ii) Anti-metabolites

ఈ క్రింది పదాలను తగిన ఉదాహరణలతో వివరించుము.

i) మెటబొలైట్స్ ii) ఆంటి మెటబొలైట్స్

2. a) How drugs are classified according to their structure?

ఔషధాలు వాటి నిర్మాణము ఆధారంగా ఎట్లు వర్గీకరింపబడినవి?

(OR)

- b) Discuss the classification of drugs based on therapeutic activity.

ఔషధ క్రియాశీలత ఆధారంగా ఔషధాల వర్గీకరణను గూర్చి చర్చించుము.

- 3) a) Write about the synthesis of Chloroquin.

క్లోరోక్విన్ యొక్క సంశ్లేషణ విధానమును వ్రాయుము

(OR)

- b) Write about the synthesis and therapeutic activity of paracetamol.

పారాసెటమాల్ యొక్క సంశ్లేషణ మరియు క్రియాశీలతను గూర్చి వ్రాయుము

- 4) a) Write about the synthesis of salbutamol.

సాల్ బ్యుటమాల్ యొక్క సంశ్లేషణ విధానమును వ్రాయుము

(OR)

b) Describe the synthesis of any one diuretic.

ఏదేని ఒక డైయూరిటిక్ యొక్క సంశ్లేషణ విధానమును వర్ణించుము

PART - B

5 x 4 = 20 Marks

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

క్రింది వానిలో ఏదేని ఐదు ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతీ దానికి ఐదు మార్కులు.

5) Define pharmacy and pharmacology.

ఫార్మసీ మరియు ఫార్మకాలజీ పదాలను నిర్వచించుము

6) Define pharmacophore and give two examples.

ఫార్మకోఫోర్ ను నిర్వచించి, రెండు ఉదాహరణలిమ్ము.

7) Write the clinical, generic and trade names of paracetamol.

పారాసెటమాల్ యొక్క క్లినికల్, జనరిక్ మరియు వ్యాపార నామములు వ్రాయుము.

8) Describe the types of administration of drugs.

ఔషధ సేవనము యొక్క వివిధ రకాలను వర్ణించుము.

9) Write about the therapeutic activity of chloroquine.

క్లోరోక్విన్ యొక్క ఔషధ క్రియాశీలతను గూర్చి వ్రాయుము.

10) Define hypnotics and tranquilizers.

హిప్పనటిక్స్ మరియు ట్రాంక్విలైజర్స్ లను నిర్వచించుము.

11) What are known as pharmacodynamic drugs?

ఫార్మకోడైనమిక్ ఔషధాలు అని వేనినందురు?

12) Write notes on retro virus.

రెట్రోవైరస్ గూర్చి వ్యాఖ్య వ్రాయుము.

PART- B

4 x 2 = 8 Marks

Answer **ALL** the questions. Each carries **TEN** marks.

అన్ని ప్రశ్నలకు సమాధానము నిమ్ము. ప్రతీ దానికి పది మార్కులు.

13) What is meant by group positive and group negative bacteria.

గ్రూపు పాజిటివ్, మరియు గ్రూపు నెగటివ్ బ్యాక్టీరియా అనగానేమి?

14) Define Generic Name and Chemical name with examపిప్లె.

జనరిక్ మరియు కెమికల్ నామములను ఉదాహరణలతో తెలుపుము.

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
III B.Sc. Ag. BBC – SEMESTER VI
CLUSTER ELECTIVE PAPER – VIII D1
SYLLABUS FOR VIII D1: SOILS AND FERTILIZERS

SOILS UNIT I:

Formation, nature, origin, composition, classification of Soil, Organic and Inorganic constituents. Characteristics, acidity, salinity, alkalinity of soils, pH and its effects on nutrient availability, buffering capacity of soils. Limiting of soil. Absorption of cations and anions

SOILS UNIT II:

Chemistry of weathering of materials soils and clay minerals, availability of soil nutrients to plants,
Macro and Micro-nutrients of Soils - Soil analysis

FERTILIZERS UNIT III:

Nitrogen fertilizers: Nitrogen fertilizers and there soil reaction. Fate of NO_3 and NH_4 ions in soils, denitrification, nitrogen fixation by legumes.

Phosphate fertilizers: Phosphate in soil, pH, microbes and available phosphorous and its control.

Potassium availability in soil, nutrient availability in soil, soil fertility evaluation, law of minimum and law of diminishing return, diagnostic techniques.

Soil fertility and nutrients, recycling of nutrients, chelation and soil management, Bio - Fertilizers.

PESTICIDE FORMULATIONS UNIT IV:

Different types of formulations and their physio-chemical characteristics and important BSI

Specification. Wettable powders, Solutions, Emulsifiable concentrates, Aerosols, Dusts and

Granules.

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
III B.Sc. Ag. BBC – SEMESTER VI
CLUSTER ELECTIVE PAPER – VIII D1
MODEL QUESTION PAPER

Time: 3 Hours

Marks: 60 M

Note: Answer all question. All questions carry equal marks.

4x8 = 32 M

1) pH and its effects on nutrient availability

(or)

Explain soil analysis

2) Explain about soil fertility and nutrients

(or)

Write about Nitrogen Fertilisers and their soil reaction.

3) Write about emulsifiable concentrates and aerosols

(or)

Available phosphorous and its control in phosphate fertilizers

4) Write a note on the following:

a) Bio fertilizers b) Classification of Soils

(or)

Different types of pesticide formulation and their physicochemical characteristics

SECTION - B

Answer any five questions.

5x4 = 20 M

1) Alkalinity of soils

- 2) Macro and micro nutrients of soils
- 3) Nitrogen fixation in Legumes
- 4) Buffering capacity of soils
- 5) Soil fertility evaluation
- 6) Recycling of nutrients
- 7) Wettable powders
- 8) Important BSI specifications

SECTION – C

Answer all questions

4x2 = 8 M

- 1) Composition of soil
- 2) Chelation
- 3) Weathering of materials
- 4) Clay minerals

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
III B.Sc. Ag. BBC – SEMESTER VI
CLUSTER ELECTIVE PAPER – VIII D2
SYLLABUS FOR VIII D2: PEST MANAGEMENT

UNIT - I HERBICIDES & FUNGICIDES:

Herbicides: Classification, selectivity and uptake of herbicides, structure- activity relationship (SAR), mode of action and uses of the following classes with special reference to the individual compounds mentioned:

- (a) **Aryl Alkanoic Acids:** 2, 4 D, MCPA, dicamba, dichlorobenzil, and dalapon.
- (b) **Triazines:** Simazine.
- (d) **Bipyridiniums, paraquat and glyphosate**
- (e) **Sulfonylurea:** Chlorosulfuron
- (f) **Uracils:** Bromacil

UNIT - II FUNGICIDES:

Types of fungicides, Mode of action; Chemistry of the following compounds:

Copper and mercury derivatives

Dithiocarbamates: Thiram, Ziram,

Dinitrophenols: 2, 4-Dinitro o-Cresol (DNOC) Karathane

Quinines: Dichlone

Benzimidazoles: Benomyl.

Triazoles: Propiconazole

Role of Fumigants and fumigation techniques. Nematicides, Molluscicides and Rodenticides.

UNIT - III CONVENTIONAL AND BIOLOGICAL INSECTICIDES:

Conventional Insecticides: Carbamate insecticides, pesticidal properties of following carbamate insecticides: Carbaryl, Methomyl.

Mode of action of carbamate insecticides.

Organophosphorus insecticides Nomenclature and structural diversities of organophosphorus compounds; Mode of action of organophosphorus insecticides.

Organochlorine Insecticides

properties of organophosphorus insecticides The chlorinated cyclodienes and their stereochemistry: Chloridane, heptachlor, aldrin, dieldrin endosulfan.

Mode of action of organochlorine insecticides.

Biological Insecticides:

Pyrethrum Properties of Natural pyrethroids

Synthetic analogs of Pyrethroids: Allethrin, fenvalerate, decamethrin.

Mode of action of pyrethroids. Azadirachtin

Novel insect-control chemicals :

Repellants, chemosterilants, antifeedants

Sex attractants

UNIT – IV INTEGRATED PEST MANAGEMENT:

Pest : Definition and its ecological validity; factors responsible for emergence of pest; pest resurgence; economic injury level; pest load; carrying capacity.

Biological control: Principle; bio-control agents- Parasitoids, predators and pathogens; advantages and drawbacks.

Chemical control: conventional insecticides; control with reference to chlorinated hydrocarbons; organophosphates; carbamates; botanical; synthetic pyrethroids; fumigants; IGR compounds & pheromones.

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
III B.Sc. Ag. BBC – SEMESTER VI
CLUSTER ELECTIVE PAPER – VIII D2
MODEL QUESTION PAPER

Time: 3 Hours

Marks: 60 M

Note: Answer all question. All questions carry equal marks.

4x8 = 32 M

1) Classification, selectivity and uptake of herbicides

(or)

Chemistry of di thio carbamates

2) Nomenclature and structured diversity of organo-phosphorous insecticides

(or)

Mode of action of organochlorine insecticides

3) Factors responsible for emergence of pests

(or)

Write about conventional insecticides

4) Advantages and drawbacks of biological control

(or)

Explain the Structure activity relationship (SAR) of herbicides

SECTION - B

Answer any five questions.

5x4 = 20 M

1) Mode of action of carbamate insecticides

2) Types of fungicides with examples

3) Novel insect-control chemicals

4) Uses of Chlorosulfuron and Bromacil

5) Stereochemistry of Aldrin

6) Ecological validity of pests

- 7) Advantages and drawbacks of biological control
- 8) Conventional insecticides

SECTION – C

Answer all questions

4x2 = 8 M

- 1) What are rodenticides? Give an example
- 2) Definition of pest management
- 3) What is meant by pest load?
- 4) Name any two fumigants

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
III B.Sc. Ag. BBC – SEMESTER VI
CLUSTER ELECTIVE PAPER – VIII D3
SYLLABUS FOR VIII D3: AGRICULTURAL CHEMISTRY

UNIT-I AGRO CHEMISTRY:

The Role of Agro chemistry- Safe use of Chemicals – Agricultural Bio – Technology _ Diffuse Pollution Management – Best Land Management Practices – Environmental impacts – The Role of Fertilisers – Agricultural Chemicals – Synthetic fertilisers – Agriculture Pollution – Subsurface Point-source Contamination – Chlorinated Solvents Contamination.

UNIT – II AGRICULTURAL CHEMICALS:

Occurrence and fate of Chemicals used in Agriculture – Pesticide Contamination in various Pesticide-use Settings – Fires in Agriculture Chemicals – Fighting Fires involving Agricultural Chemicals – Ground water contamination by Agricultural Chemicals.

UNIT – III AGRO CULTURAL CHEMISTRY & SOIL ECOSYSTEM:

Inorganic Components of the Agricultural Ecosystem - Organic Components of the Agricultural Ecosystem – Soil Chemistry – Soil Microbiology and Biochemistry – Human Manipulation of Agricultural Ecosystems – Rice Ecosystem – Contamination in Lake Ecosystem.

UNIT – IV ROLE OF FERTILISERS IN AGROCHEMISTRY:

Introduction - Nitrogen (N) - Movement of N to Plant Roots - Internal Transformations of N in Soil - Losses of N from Soil - Phosphorus (P) - Gains of P to Soil - Internal Transformations of P in Soil - Losses of P from Soil - Potassium (K) - Gains of K to Soil - Crop Uptake and Removal of K from Soil - Movement of K to Plant Roots - Internal Transformations of K in Soil - Losses of K from Soil - Sulphur (S) - :Gains of S to Soil - Crop Uptake and Removal of S from Soil - Movement of S to Plant Roots - Internal Transformations of S in Soil - Losses of S from Soil – Calcium – Role of Calcium in Agro chemistry.

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III B.Sc. Ag. BBC – SEMESTER VI
CLUSTER ELECTIVE PAPER – VIII D3 AGRICULTURAL CHEMISTRY
MODEL QUESTION PAPER

Time: 3 Hours

Marks: 60 M

Note: Answer all question. All questions carry equal marks.

4x8 = 32 M

1) Write a note on Agricultural Biotechnology

(or)

Write a note on Role of Fertilisers in Agricultural Chemistry?

2) Pesticide contamination in varied Pesticide use settings.

(or)

Fighting fires involving Agricultural Chemicals

3) Organic Components of the Agricultural Ecosystem

(or)

Write a note on Soil Chemistry

4) The Role of Nitrogen in Agro chemistry

(or)

The Role of Potassium in Agro chemistry

SECTION - B

Answer any five questions.

5x4 = 20 M

5) Safe use of Chemicals

6) Land Management Practices

7) Chemical Fires

8) Occurrence of Chemicals in Agriculture

9) Contamination in Lake Ecosystem

10) Agricultural Ecosystem

11) Internal Transformation of Phosphorus in soil.

12) Movement of Sulphur in Plant Roots

SECTION – C

Answer all questions

4x2 = 8 M

13) Agricultural Pollution

14) Give two examples for Agricultural Chemicals.

15) Mention two inorganic components in Agricultural Ecosystem.

16) What is NPK in Fertilisers?

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
SYLLABUS FOR VI SEMESTER
III B.Sc. CHEMISTRY ELECTIVE – VIII E1
P – VIII E1 - FOOD ADDITIVES AND ANALYTICAL TECHNIQUES

MODULE I: FOOD ADDITIVES - I:

- Introduction,
- Need of food additives in food processing and preservation.
- Characteristics and classification of food additives.

Definitions, uses and functions of:

- Acids, Bases, Buffer system, Chelating / sequestering agents,
- Emulsifying and Stabilizing agents, Anticaking agents, Thickeners, Firming agents.
- Flour bleaching agents and Bread improvers. class-I and Class –II preservatives, (a)

Chemistry of food flavor:

- Flavour and flavour enhancers; Flavour improvers;
- Humectants and anticaking agents; Leavening agents.
- Functional characteristics of different flavors,
- Philosophy and definitions of flavor,
- Flavourmatics /flavouring compounds,
- Sensory assessment of flavor,
- Technology for flavor retention
- Natural flavour- Types, ,Artificialflavour- Types, ,
- Effect of processing on flavour

MODULE II: FOOD ADDITIVES – II:

Antimicrobial agents. -

- Nitrites, sulphides, sulphur di oxide, sodium chloride, hydrogen peroxide.

Antioxidants -

- Introduction, mechanism of action, natural and synthetic anti-oxidants, □
Technological aspect of antioxidants.

Non-nutritive and low calorie sweeteners:

- Introduction, importance, classification- natural and artificial, chemistry, technology and toxicology
- consideration for choosing sweetening agents.

pH control agents:

- Preservatives Stabilizer & thickeners, □ Fat replacers, Texturizers & improvers
- **(d)Regulatory aspects:**
- Natural and synthetic permitted food colors,
- Properties of certified dyes, Use of regulatory dyes,
- Color losses during thermal processing

(e)Chemical, technological and toxicological aspects of Food Additives:

- Risk assessment studies-
- Safety and quality evaluation of additives and contaminants
- Acute and chronic studies, NOEL, ADI, LD50

MODULE III INTRODUCTION TO ANALYTICAL INSTRUMENTATION:

- Introduction to Analytical Instrumentation,
- Classification of Analytical Methods,
- Types of instrumental Methods,
- Selecting an Analytical Method, Calibration of Instrumental methods.
- Beer Lambert Law, Principle, Instrumentation; Single beam, Double beam spectrophotometry.
- Application in the Analysis of food constituents such as Sugars, Amino acids & Minerals such as Iron, Phosphorous and Ascorbic Acid.

MODULE IV CHROMATOGRAPHY:

- a) TLC: Principle, Choice of Solvents, Preparation of TLC plates development of TLC plates, Locating Agents, Rf. Values, Application of TL Chromatography to Carbohydrates & Proteins
- b) GLC: Principle, Stationary Phase, Application of sample, Separation & dilution of colouring matter, flavor constituents and Aromatic compounds, C) HPLC: Principle of HPLC, stationary phase in HPLC, Normal phase HPLC, Reversed phase HPLC: Applications for food colours.

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
III B.Sc. FMZC VI SEMESTER ELECTIVE – VIII E1
P – VIII E1 - FOOD ADDITIVES AND ANALYTICAL TECHNIQUES
MODEL QUESTION PAPER

Time: 3 Hours

Marks: 60 M

Note: Answer all question. All questions carry equal marks.

4x8 = 32 M

- 1) a) Explain food additives.
(or)
a) Write brief account on food additives.
b) Explain chemical, technological, and toxicological aspects of food additives.
- 2) a) Analysis of sugars, amino acids and minerals.
(or)
b) Analysis of Thiamine and Riboflavin.
- 3) Beer Lambert Law, Principle & Instrumentation of Double beam spectrophotometer.
(or)
How can you determine the food constituents such as Sugars, Amino acids by Spectrophotometer?
- 3) a) Detection of carbohydrates and proteins by TLC
(or)
b) Separation & dilution of colouring matter, flavor constituents and Aromatic compounds by GLC.

SECTION - B

Answer any five questions.

5x4 = 20 M

- 1) Write about class-I and class-II preservatives.
- 2) What are the technological aspects of antioxidants?

- 3) What are preservatives, stabilizers and thickeners? Give one example for each.
- 4) Classification of food additives.
- 5) Development of TLC
- 6) Types of Instrumental Methods
- 7) Reverse phase HPLC
- 8) Write about sources in Spectro photometers.

SECTION - C

Answer all questions.

4x2 =8 M

- 1) Need of food additives
- 2) Types of natural flavours
- 3) Write about Rf value
- 4) What is Beer Lambert's law?

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
III B.Sc. FMZC VI SEMESTER ELECTIVE – VIII E2
SYLLABUS FOR PAPER VIII E2
CHEMICAL ASPECTS IN FOOD QUALITY AND PACKAGING

MODULE I QUALITY CONTROL:

Food Quality Assurance: Design of company quality assurance program, Microbiological concerns.

Managing quality in supply chain and marketing of food products.

Government Regulations In Quality Control: FAO/WHO codex Alimentarius commission, PFA, AGMARK, BIS, FPO, fair average quality (FAQ) specification for food grains, ISO 9000 series.

HACCP: Background, current status, structured approach, principles, benefits and limitation.

Consumer Protection Act (CPA)

Food Standards of different items like :

Cereals and products - bread, biscuits, **Fruits**

Products: Jam, juices, sauce.

Oils and Fats: Coconut oil, groundnut oil, palm oil, sunflower oil, vanaspati.

Milk and Products: Skimmed milk powder, partly skimmed milk powder, condensed sweetened milk. Other products - coffee, tea, sugar, honey, toffees.

MODULE II: FOOD SAFETY:

Meaning of food safety, Importance of Food Quality and safety for developing countries.

Patent: Definition, requirements, patent law in India, administrator, need for patent system, advantages, precautions to be taken by applicants, patent procedures, nonpatentable.

Food Hazards: Physical, Chemical, hazards associated with food types. Effect of processing and storage

MODULE III FOOD PACKAGING I: Definition, functions of packaging materials for different foods, characteristics of packaging material. Food packages – bags, pouches, wrappers, tetra packs. flexible packaging, Mechanical strength of different packaging materials.

Labeling: Standards, purpose, description types of labels, Printing of packages . Barcodes & other packing ,marking regulation , nutrition labeling, health claims, mandatory labeling provision.

Type of packaging materials properties of the following packaging materials-low density polyethylene, high density polyethylene, polypropylene ,polyvinyl chloride, poly vinylidene chloride, ethylene vinyl alcohol, polystyrene, polyethylene terephthalate, nylon, ethylene vinyl acetate, ethylene acrylic acid, ethylene meth acrylic acid, ionomers.

Modern Packaging Materials and Forms: Glass containers, metal cans, composite containers, aerosol containers, rigid plastic packages, semi rigid packaging, flexible packaging.

MODULE III FOOD PACKAGING II:

Packaging regulations: Interactions between packaging material and foods; Environmental and cost consideration in selecting packaging materials. Manufacture of packaging materials; Potential of bio composite materials for food packaging; Packaging and food preservation; Disposal of packaging materials.

Biodegradable packaging material - biopolymer based edible firm.

Type of packaging materials; Selection of packaging material for different foods; Selective properties of packaging film; Methods of packaging and packaging equipment.

Packages of Radiation Stabilized Foods: Introduction, rigid containers, flexible containers, general methods for establishing radiation stabilization. Radiation measurement of radiations.

Packages of dehydrated products. Orientation, metallization, co-extrusion of multilayer films, stretch, package forms and techniques. modified and controlled atmosphere packaging, skin, shrink and cling film packaging, micro-ovenable containers, other package forms and components of plastics.

Packaging of Finished Goods: Weighing, filling, scaling, wrapping, cartooning, labeling, marking and trapping.

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III B.Sc. VI SEMESTER CHEMISTRY ELECTIVE – VIII E2
P – VIII E2 CHEMICAL ASPECTS IN FOOD QUALITY AND PACKAGING
MODEL QUESTION PAPER

Time: 3 Hours

Marks: 60 M

Note: Answer all question. All questions carry equal marks.

4x8 = 32 M

1) Explain stages of quality control in food industry

(or)

Write an account on ISO 9000 series

2) Explain the importance of food quality and safety

(or)

Need, requirements and advantages of patent system

3) Write about methods of packaging and packaging equipment

(or)

Explain the characteristics and functions of packaging material

4) What isv the labelling of Packaging Material.

(or)

What are the regulations while packaging materials?

SECTION – B

Note: Answer any five questions.

5x4 = 20 M

- 1) Marketing of food products
- 2) Write about consumer protection act
- 3) Effect of processing and storage
- 4) Write about packing marking regulation
- 5) Functions of packaging materials for different foods
- 6) Manufacture of packing materials

- 7) Food standards of fruit products
- 8) Write about Biodegradable packaging material

SECTION – B

Note: Answer all questions.

4x2 = 8 M

- 1) What is quality control
- 2) Patent law in India
- 3) Composite containers
- 4) Flexible containers

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM.
SYLLABUS FOR VI SEMESTER
III B.Sc. CHEMISTRY ELECTIVE – VIII E3
P – VIII E2 FOOD ADULTERATION & FOOD ANALYSIS

MODULE – I FOOD ADULTERATION:

- 1) Food adulteration
- 2) Common food adulterants of main food stuffs
- 3) Detection or microscopic examination adulterants in some common food stuffs
 - a) Cereals b) Pulses c) Beverages d)Milk e) Vegetable oils and fats, pure ghee, Sweets g) Spices and Condiments
- 4) Food Additives
- 5) Contamination of food stuffs
- 6) Sampling of can contents
- 7) Direct microscopic examination
- 8) Interpretation of Results

MODULE – II QUALITATIVE FOOD ANALYSIS:

Introduction – Qualitative analysis – Qualitative analysis of Carbon, Hydrogen, Halogens and Oxygen - Test for proteins, Colour test for proteins, Test for carbohydrates.

MODULE – III QUANTITATIVE FOOD ANALYSIS –I:

Determination of Moisture, Ash, Crude fat or ether-extract, Soluble extractor, Crude protein, True protein, Crude fiber, Starch, Analysis of Sugars (Carbohydrates), Estimation of Sucrose in a given sample of cane sugar, Estimation of Glucose and Sucrose in Cane Sugar- Estimation of Glucose and Sucrose in a given sample of Gur (iodometric method)Determination of Phosphorous in plant or food material, Destruction of organic matter, Important points,

MODULE – IV QUANTITATIVE FOOD ANALYSIS –II:

Flame Photometry: Determination of food materials by flame photometry- Pressure Regulators and flow meters-Flame source-Atomizers and Burners-Optical and Electronic system- photosensitive detectors-Flame photometers-Determination of calcium, Sodium, Potassium in foods.

Atomic absorption spectrometer: Principle, Instrumentation with Illustrations of Hallow cathode lamp, nebulizer, photo multiplier tube, interferences; Chemical & Ionization, Quantitative applications to minerals in Food Material such as High calcium foods, Iron rich foods etc.,

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SYLLABUS FOR VI SEMESTER
III B.Sc. CHEMISTRY ELECTIVE – VIII E3
P – VIII E3 FOOD ADULTERATION & FOOD ANALYSIS

Time: 3 Hours

Marks: 60 M

SECTION - A

Answer all questions.

4x8 = 32 M

- 1) Explain the common detection methods of Food Adulterants

(or)

Explain direct microscopic examination

- 2) Explain the qualitative determination of Carbon and halogens.

(or)

Explain the following:

- a) Test for Proteins b) Test for Carbohydrates

- 3) Determination of Sodium and Potassium in Food Materials by flame photometry.

(or)

Explain the following: a) Flame Sources b) Flame Photometers

- 4) Principle & Instrumentation of Atomic Absorption Spectrometer

Determination of Calcium and Magnesium in Food Materials.

SECTION – B

Answer any five questions

5x4 = 20 M

5) Food Adulteration

6) Food Additives

7) Colour Test for Proteins

8) Test for Hydrogen

9) Estimation of Crude Fiber

10) Estimation of Sucrose

11) Gratings

12) Photocells

SECTION – C

Answer all questions

4x2 = 8 M

13) Adulteration of Milk.

14) Differentiate Crude Protein & True Protein.

15) Nebulisers

16) Principle of Flame Photometry

SYLLABUS FOR VI SEMESTER
CHEMISTRY LABORATORY COURSE – VIII-A-1/ VIII-B-1/ VIII-C-1

No. of h/w : 2

50 Marks

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

CHEMISTRY LABORATORY COURSE - VIII-A-1/ VIII-B-1/ VIII-C-1

(at the end of semester VI)

Max. Marks: 50

Time: 3 hrs.

SCHEME OF VALUATION

For Record - 10 Marks

For Viva-voce - 5 Marks

For Practical - 35 Marks

Splitting of Practical Marks

i) Procedure : 20 Marks

ii) Equation : 5 Marks

iii) M.P. : 5 Marks

iv) Report of yield : 5 Marks

SYLLABUS FOR VI SEMESTER

CHEMISTRY LABORATORY COURSE – VIII-A-2/ VIII-B-2/ VIII-C-2

No. of h/w : 2

50 Marks

1. Electrochemistry:

Determination of redox potential of $\text{Fe}^{2+} / \text{Fe}^{3+}$ by potentiometric titration of ferrous ammonium sulphate vs. potassium dichromate.

2. pH metry:

i) Preparation of phosphate buffer solutions.

ii) pH metric titration of weak acid, acetic acid with strong base, NaOH and calculation of dissociation constant.

3. Colorimetry:

i) Verification of Beer-Lambert law for KMnO_4 and determination of concentration of the given solution.

ii) Verification of Beer-Lambert law for $\text{K}_2\text{Cr}_2\text{O}_7$ and determination of concentration of the given solution.

iii) Verification of Beer-Lambert law for CuSO_4 and determination of concentration of the given solution.

iv) Composition of complex of Cu^{2+} -EDTA disodium salt.

CHEMISTRY LABORATORY COURSE - VIII-A-2/ VIII-B-2/ VIII-C-2

(at the end of semester VI)

Max. Marks: 50

Time: 3 hrs.

SCHEME OF VALUATION

For Record - 10 Marks

For Viva-voce - 5 Marks

For Practical - 35 Marks

Splitting of Practical Marks

i) Procedure in first 10 min. : 5 Marks

ii) Formula with units : 5 Marks

iii) Neat tabulation & correct calculation : 5 Marks

Error < 10% : 20 Marks

Error 10-15 % : 15 Marks

Error > 15 % : 10 Marks (Minimum Marks)

SYLLABUS FOR VI SEMESTER
CHEMISTRY LABORATORY COURSE – VIII-A-3/ VIII-B-3/ VIII-C-3

50 Marks

PROJECT WORK

FOR I YEAR BA/B.COM/B.Sc. STUDENTS

Environmental Studies II Semester Syllabus

Module-I : Natural Resources: The Multidisciplinary nature of Environmental Studies- Definition, scope and importance-Need for public awareness-Renewable and Non-Renewable Resources-

Natural Resources and associated problems-**Forest Resources:** Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people-

Water Resources: use and over - utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems-

Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies-

Food Resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer- pesticide problems, water logging, salinity, case studies-

Energy Resources Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies-

Land Resources: Land as resources, land degradation- man induced landslides, soil erosion and desertification-Role of an individual in conservation of natural resources-Equitable use of resources for sustainable lifestyles

Module-II : Ecosystems, Biodiversity and its Conservation:Concept of an ecosystem-

Structure and function of an ecosystem-Producers, consumers and decomposers-Energy flow in the ecosystem-Ecological succession-Food chains, food webs and ecological pyramids-

Introduction, types, characteristic features, structure and function of the following ecosystem:-

Forest Ecosystem, Grassland Ecosystem, Desert Ecosystem, Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) Introduction-Definition genetic, species and ecosystem diversity-Biogeographically classification of India-Value of biodiversity-Consumptive use, productive use, social, ethical aesthetic and option values-Biodiversity at global, National and local levels-India as a mega diversity nation-Hot spots of biodiversity-Threats to biodiversity habits loss, poaching of wildlife, man wildlife conflicts-Endangered and endemic species of India-Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Module-III: Environmental Pollution: Definition, Causes, effects and control measures of:-Air pollution, Water pollution Soil pollution, Marine pollution, Noise pollution, Thermal pollution and Nuclear pollution-Solid waste management: Causes, effects and control measures of urban and industrial wastes-Role of individual in prevention of pollution-Disaster management: floods, earthquake, cyclone and landslides

Module-IV: Social Issues and the Environment: From Unsustainable to Sustainable development-Urban problems related to energy-Water conservation, rain water harvesting, watershed management-Resettlement and rehabilitation of people; its problems and concerns Case studies-Climate change, global warming, acid rain, ozone layer depletion,nuclear accidents and holocaust, case studies-Wasteland reclamation, Consumerism and waste products- Environment protection Act-Air (Prevention and control of Pollution) Act- Water (Prevention and control of Pollution) Act-Wildlife Protection Act, Forest Conservation Act-Issues involved in enforcement of environmental legislation-Public awareness

ModuleV-: Human Population and the Environment: Population growth, variation among nations-Population explosion- Family welfare Programme-Environment and human health- Human Rights-Value Education-HIV/AIDS-Women and Child Welfare-Role of information Technology in Environment and human health.

GOVT.COLLEGE (AUTONOMOUS)-) RAJAHMUNDRY
Environmental Studies Model Question Paper
II Semester(I B.Sc/BA/B.com)

Time: 2 hrs

Max Marks: 50M

Section - A

Answer any Two Questions

2x10=20M

ఈ క్రింది వానిలో ఏవైనా రెండు ప్రశ్నలకు సమాధానమిమ్ము.

1. Explain the definition, scope and Importance of Environmental Studies?

పర్యావరణ అధ్యయనాల యొక్క నిర్వచనము, పరిధి మరియు ప్రాముఖ్యమును వివరించుము.

2. What is Bio-diversity? What are the threats to it and how it is conserved?

జీవ వైవిధ్యము అనగానేమి? దానికి గల ముప్పును మరియు నివారణ పద్ధతులను వ్రాయుము.

3. Write an essay on the causes, ill effects and preventive measures of Air pollution.

వాయు కాలుష్యానికి గల కారణాలను, దుష్ప్రభావములు మరియు నివారణలపై వ్యాసము వ్రాయుము.

4. What is an Eco system? Describe Forest Ecosystem.

జీవావరణ వ్యవస్థ అనగానేమి? అటవీ వ్యవస్థను వివరించుము.

Section -B

Write notes on any Four questions

4x5=20 M

ఈ క్రింది వానిలో ఏవైనా నాలుగు ప్రశ్నలకు సమాధానమిమ్ము.

5. Human Rights.

మానవ హక్కులు.

6. Ecological Pyramids.

పర్యావరణ పిరమిడ్లు.

7. Global Warming.

భూమి వేడెక్కుట.

8. Population Growth.

జనాభా విస్తరణ.

9. Conflicts over Water.

జల వివాదాలు.

10. Disaster Management.

విపత్తు నిర్వహణ.

Section-C

Answer all Questions.

5x 2 =10 M

ఈ క్రింది ప్రశ్నలన్నింటికీ సమాధానమిమ్ము.

11. Food Chain

ఆహారపు గొలుసు.

12. Noise Pollution.

శబ్ద కాలుష్యము.

13. HIV & AIDS.

హెచ్.ఐ.వి. మరియు ఎయిడ్స్.

14. Rain Water Harvesting.

వాన నీటి సంరక్షణ.

15. Soil Erosion.

భూమి కోత.

Recommended Text Books and Reference Books

SUGGESTED READINGS

1. Pedigo, L.P. 1996) Entomology and pest management, prentice hall, n. Delhi.
2. Rajeev k. Upadhyay, (2000) IPM system in Agriculture, Vol. 1. Aditya Books Pvt. Ltd. New Delhi, India
3. Raymond A. Cloyd , Philip L. Nixon and Nancy R. Pataky. 2004. IPM for Gardeners: A Guide to Integrated Pest Management, Timber Press
4. Horowitz, A.Rami and Ishaaya, Isaac. (2009) Insect Pest Management - Field and Protected Crops by
5. Mary Lou Flint and Robert van den Bosch, (1981). Introduction to Integrated Pest Management, New York: Plenum Press,
6. Robert F Norris, Edward P Caswell Chen, Marcos Kogan. (2003) Concepts in Integrated Pest Management Prentice Hall.
7. Gabrielle J Persley. (1996) Biotechnology and Integrated Pest Management by C.A.B.
8. . deMan, John M.,
9. Principles of Food Chemistry ,3rd Ed., Springer 1999
10. Desrosier, Norman W. and Desrosier.,James N.,The technology of food preservation , 4th Ed.,Westport, Conn. : AVI Pub. Co., 1977.
11. Fennema, Owen R, Food Chemistry, 3rd Ed., Marcell Dekker, New York, 1996
12. Fuller, Gordon W, New Product Development From Concept to Marketplace, CRC Press,2004.
13. Whitehurst and Law, Enzymes in Food Technology, CRC Press, Canada, 2002
14. Plant nutrition and fruit preservation by Yawalkar.
15. Fish and fisheries of India by Jhingran.
16. Wealth of India supplements IV.
17. Hand book of Agriculture - I.C.A.R.
18. Hand book of Animal Husbandry - I.C.A.R.
19. Plant physiology by Sundaram.

20. Soil fertility and fertilizer by Tisdale and Nelson.
21. Analytical agricultural chemistry by J.S. Kanwar
22. Practical manual for introductory by J.S. Kanwar
23. Crop production and field experimentation by Vaidya and Sahashrabuddhe.
24. Manures and Fertilizers by Yawalkar
25. Advance Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan
26. Concise Inorganic Chemistry by J.D.Lee
27. Inorganic Chemistry by J.E. Huheey
28. Basic Inorganic chemistry by Cotton and Wilkinson
29. Stereochemistry by P.S. Kalsi
30. Stereochemistry of organic compounds by D Nasipuri
31. Organic Chemistry by Bruise
32. Organic Chemistry by Morrison and Boyd
33. A text of Qualitative inorganic analysis by A.I.Vogel
34. Advance Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan
35. Concise Inorganic Chemistry by J.D.Lee
36. Inorganic Chemistry by J.E. Huheey
37. Basic Inorganic chemistry by Cotton and Wilkinson
38. Principles of physical chemistry by prutton and Marron
39. Advanced physical chemistry by Bahl and Tuli
40. Text book of physical chemistry by K L Kapoor
41. Text book of physical chemistry by S Glasstone
42. Text Book of Organic chemistry by Vol I by I.L. Finar Vol I
43. Organic chemistry by Bruice
44. Spectroscopy by William Kemp
45. Spectroscopy by Pavia
46. Organic Spectroscopy by J. R. Dyer
47. Inorganic Chemistry J E Huheey, E A Keiter and R L Keiter
48. Basic Inorganic Chemistry by Cotton and Wilkinson
49. Concise Inorganic Chemistry by J.D.Lee

50. Advanced Physical Chemistry by Atkins

51. Introduction to Electrochemistry by S. Glasstone
