P. R. GOVERNMENT COLLEGE
(AUTONOMOUS)
KAKINADA

(Affiliated to Adikavi Nannaya University, Rajamahendravaram)

DEPARTMENT OF CHEMISTRY

B.Sc. Analytical Chemistry
(Syllabus under CBCS)

Board of Studies
(2021-22)

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

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

I Composition

i. Head of the Department concerned (Chairman):

Sri. Rambabu Vasamsetti, M.Sc., B.Ed., SET.

ii. The entire faculty of each specialization.

1. Dr. D. Rama Rao, M.Sc., B. Ed., M.Phil. Ph.D.
2. Dr. D. Chenna Rao, M.Sc., Ph.D.
3. Sri V. Sanjeeva Kumar MSc., NET
4. Sri T V V. Satya Narayana, M.Sc., B.Ed., SET.
5. Sri P. Vijaya Kumar, M.Sc., NET.
6. Smt. G. Pavani, M.Sc., B.Ed., SET
7. Dr. T. Uma Maheswara Rao, M.Sc., Ph.D.
8. Dr. N. Bujji Babu, M.Sc., Ph.D.
9. Dr. Ch. Praveen, M.Sc., Ph.D.
10. Kum. A. Lakshmi Bhavani. M.Sc.

iii. One expert to be nominated by the Vice-Chancellor from a panel of six recommended by the College Principal

Dr. Dr. K. Jhansi Lakshmi, Principal, ASD WOMEN'S COLLEGE, KAKINADA

iv. One expert in the subject from outside the college to be nominated by the Academic Council

Sri U. Sai Krishna, Lecturer in Chemistry, Govt. College(A), Rajamahendravaram

v. One representative from industry/ Corporate Sector/ allied area relating to Placement.

Dr. B. Ramesh Babu, Founder & M. D., BogaR Laboratories, Peddapuram

vi. One postgraduate meritorious alumnus to be nominated by the Principal.

The chairman, Board of Studies, may with the approval of the Principal of the College, Co-opt.

Dr. K. Raghava Chari, M.Sc., M.Phil., Ph.D.

II. Term.

The term of the nominated members shall be two years.

III. Meeting

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

IV. Functions

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

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

P.R. GOVT.COLLEGE (A), KAKINADA

Department of Analytical Chemistry

Minutes of board of studies (BOS) meeting 2021-22 on 02. 12. 2021 at 10.00 am

Meeting of Board of Studies in Chemistry is convened on 02 December 2021 through offline at P.R. Govt. College (A), Kakinada, at 10.00 AM.

Venue: Conference Hall, Dt: 02-12-2021, Thursday – 10.00 AM.

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

Agenda:

- To discuss the Semester System and Choice Based Credit System (CBCS) being implemented for the past 03 years, i.e., w.e.f. 2018-19.
- To discuss and approve the Continuation/Modifications of the syllabus for the Odd & Even Semesters of I, II & III Years for 2021-22.
- Grant of Extra credits for Online SWAYAM MOOCs etc.
- Syllabus, Model Question Papers and Model Blue Prints for I, II, III, IV, V and VI Semesters.
- Teaching learning methodology by 60:40(External: Internal) ratio for the present II- and III-Year Students and 50:50 (External: Internal) ratio I Year Students w.e.f. 2021-22.
- Panel of paper setters and examiners.
- Proposals for Community Service Projects/Extension activities for the benefit of the society.
- Department action plan for 2021-22.
- To discuss and resolve the minor modifications/refinement if any, in the Chemistry cluster electives CI, CII &CIII as majority of the students opting this cluster as their choice.
- Any Other Proposal with the Permission of the Chairman.

Resolutions:

The following agenda items are discussed and resolutions are made.

1. It is resolved to continue choice based credit system in the chemistry combination programmes as per the directions of the CCE, Vijayawada to the first year and second year and final year student's w.e.f. 2018-19.
2. It is resolved to approve the Continuation/Modifications of the syllabus for the Odd & Even Semesters of I, II & III Years for 2021-22.
3. It is resolved to encourage students to active participation in various activities and give extra credits for students after successful completion of a particular activity such as SWAYAM, MOOCS etc., (Annexure –II)
4. It is Resolved to follow 60%-40% external and internal w.e.f. 2017-2018 admitted batches and it continued in present second and third year students.
5. It is resolved to follow 50%-50% external and internal for first year w.e.f 2021-22 admitted batch.
6. It is resolved to allot 50 marks project work for final year students in chemistry preferably in cluster paper C - 3 practical's, w.e.f 2019-20 in accordance with APSCHE.
7. It is resolved to conduct departmental activities such as OZONE DAY, CHEM FEST, CHEMISTRY DAY and SCIENCE DAY. (Annexure-I)
8. It is resolved to implement the recommended andragogy for the first semester 2021-22
9. It is resolved to conduct practical examinations semester wise.
10. It is resolved to organize guest lectures by eminent professors.
11. It is resolved to implement pass minimum for internal assessment for CBSE pattern students as the pattern is learner oriented.
12. It is resolved to maintain status quo for same question paper pattern in II, III years.
13. It is resolved that there is no change in the syllabus in the first year (Sem –I & Sem –II) as prescribed by APSCHE, Vijayawada in the last academic year, the same syllabus will be adopted as such.
14. The following paper setters are recommended.

    1. Sri. U. Sai Krishna, Govt. College(A), Rajamahendravaram
    2. Dr. V. Narayana Rao, GDC, Perumallpuram.
    3. Dr. M. Trinadh, Govt. College(A), Rajamahendravaram.
    4. Sri. M. Sudhakar, Govt. College(A), Rajamahendravaram.
    5. Sri. K. Anand, GDC, Pithapuram.
    6. Dr. CH. Vijay Vardhan, GDC, Perumallpuram.
    7. Sri B. Surendra, GDC, Tadepalligudem.

Signatures of the members who attended the

Board of studies in Analytical Chemistry on 02. 12 .2021 at 10.00 AM

S. No.	Name of the member	Designation	Signature
1	Sri. Rambabu Vasamsetti	Chairman, Board of Studies, Lecturer in charge	
2	Dr. K. Jhansi Lakshmi	University Nominee Asst. Professor, Department of Chemistry, ASD Women's College, Kakinada.	2/12/21
3	Sri. U. Sai Krishna	Subject Expert Lecturer in Chemistry, Govt.College(A), Rajamahendravaram	02/12/21
4	Dr. B. Ramesh Babu	Industry expert/ Founder & M. D., BogaR Laboratories, Peddapuram.	
5	Dr. K. Raghava Chari	Alumnus, Retd .Principal,	
6	Dr. D. Rama Rao	Member Lecturer I/c - Dept. of Chemistry	
7	Dr. D. Chenna Rao	Member Lecturer in Chemistry	
8	Sri V. Sanjeeva Kumar	Member Lecturer in Chemistry	
9	Sri T V V. Satyanarayana	Member Lecturer in Chemistry	
10	Sri P. Vijaya Kumar	Member Lecturer in Chemistry	
11	Smt. G. Pavani	Member Lecturer in Chemistry	2/12/21
12	Dr. T. Uma Maheswara Rao	Member Lecturer in Chemistry	
13	Dr. N. Bujji Babu	Member Lecturer in Chemistry	
14	Dr.Ch. Praveen	Member Lecturer in Chemistry	2/12/2021
15	Kum. A. Lakshmi Bhavani	Member Guest Faculty in Analytical Chemistry	2/12/2021

ACTION PLAN BOS MEETING – ANALYTICAL CHEMISTRY HELD ON 02 -12 - 2021.

Department activities for AY 2021-22.

Annexure - I

S.No.	Month	Activity Proposed	Faculty Member of In charge
1.	**Nov -21**	Departmental staff meeting to review admissions and faculty recruitment	All Faculty members
2.	**Nov – 21**	Preparation of curricular plans, time- tables etc.,	All Faculty members
3.	**Dec–21**	Bridge classes	All Faculty members
4.	**Dec–21**	Student awareness programs on ragging& eve teasing - consequences, self-discipline.	All Faculty members
5.	**Dec–21**	National Chemistry Day	All Faculty members
6.	**Jan – 22**	Career guidance, higher education opportunities etc.,	All Faculty members
7.	**Feb – 22**	Study tour / Field trips	All Faculty members
8.	**Feb -22**	NATIONAL SCIENCE DAY	All Faculty members
9.	**Mar– 22**	Study tour / Field trips	All Faculty members
10	**Mar- 22**	Guest Lecture	All Faculty members

1. Organizing National/ State level seminars/Workshops/ Conferences/ Training programs etc. With topics and other details.

i). Staff development programs
ii) Awareness on OZONE protection
iii) National Chemistry day
iv) National Science day 2022
v) Guest lectures / Invited Talks
vi) Training on Soil analysis
vii) Training on water analysis

2.Change of modules in the syllabus content.

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

I. Study visits/ Field tours to Final year students: **Rs. 20,000**

1. National Institute of Hydrology, Kakinada.
2. SAR Chandra Environ Solutions, Kakinada.
3. ONGC mini refinery, Tatipaka.
4. Soil analysis laboratory, Samalkot.
5. Venky parenteral, Yanam
6. Any other relevant field visits

II. Lab equipment's: **Rs. 5, 00,000**

Lab equipment's required to conduct Practical's and to give hands on training to the students in order to build skill and confidence in the area of Analytical chemistry

III. Reference books & other necessary teaching – learning material: **Rs. 10,000**

IV. Guest Lectures / Invited talks: **Rs. 10,000**

3. Plan for organizing subject oriented community outreach programs & allocation of necessary funds. (Mandatory for each Department)

i) Awareness programs on various social / Health issue **Rs. 10,000**

4. Introduction of new programs - Certificate courses. **Rs. 10,000**

6. Any other program that enhances the learning capacity of students and their employable &knowledge skills

7. Examination reforms if any,
8. Suggest panel of examiners/paper setters & other experts/nominees for BOS deliberations.
   1. Dr. M. Trinadh, Govt. College(A), Rajamahendravaram
   2. Sri. U. Sai Krishna, Govt. College(A),Rajamahendravaram.
   3. Dr. V. Narayana Rao, GDC, Perumallpuram.
   4. Sri. M. Sudhakar, Govt. College(A), Rajamahendravaram.
   5. Sri. K. Anand, GDC, Pithapuram.
   6. Dr. CH. Vijay Vardhan, GDC, Perumallpuram.
   7. Sri B. Surendra, GDC, Tadepalligudem.

Semester wise/ Paper wise Marks / Credits allotted.

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS
I	I	I	Basic Principles & Laboratory Operations	100	04
			Practical – I	50	01
	II	II	Quantitative Methods Of Analysis	100	04
			Practical – II	50	01
II	III	III	Separation Methods – I	100	04
			Practical – III	50	01
	IV	IV	Separation Methods – II	100	04
			Practical – IV	50	01
		V	Analytical Biochemistry and Environmental Chemistry	100	04
			Practical – V	50	01
III	V	V	Analytical Biochemistry and Environmental Chemistry	100	03
			Practical – V	50	02
		VI	Instrumental Methods of Analysis	100	03
			Practical – VI	50	02
	* Any one cluster from VIII, A, B OR C	VII	Analysis of Applied Industrial Products (ELECTIVE)	100	03
			Practical – VII	50	02
	* Any one cluster from VIII, A, B OR C	VIII (C)	VIII-C-1	100	03
			VIII-C-2	100	03
			VIII-C-3	100	03
			Practical –VIII	50	02
			Practical –IX	50	02
			Practical –X: Project Work	50	02

GUIDELINES FOR ALLOTMENT OF EXTRA CREDITS

Annexure -II

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

Course Structure:

All theory papers will have 4 hours per week and practical's will have 2 hours per week up to Semester IV (Second year). In final year all theory papers will have 3 hours per week and practical's will have 2 hours per week in Semester V and V I (Final year).

Each Theory Paper shall be of 100 marks and Practical Paper shall be of 50 marks.

Total Number of Papers: 24

Mathematics : 7Papers
Chemistry : 7Papers
Analytical Chemistry: 7 Papers + 1 Cluster elective (3Papers) = 10 Papers

Objectives and outcome of the course Analytical Chemistry

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 papers of Mathematics.

After graduating in Analytical Chemistry the students can pursue academics in Chemistry, bioinformatics, forensic science, biochemistry and other disciplines of inter- disciplinary sciences. They can also use it as a stepping stone to pharmaceutical industry and for Research and Development in industry.

Program Outcomes B.Sc. (Chemistry):

Undergraduate students upon graduation with a B.Sc. degree in chemistry:

PO : 1	Have firm foundations in the fundamentals and application of current chemical and scientific theories.
PO : 2	An understanding of major concepts, theoretical principles and experimental findings in chemistry.
PO : 3	Are able to design, carry out, record and analyze the results of chemical experiments
PO : 4	Are able to use modern instrumentation and classical techniques, to design experiments, and to properly record the results of their experiment.
PO : 5	Are skilled in problems solving, critical thinking and analytical reasoning.
PO : 6	Are able to identify and solve chemical problems and explore new areas of research.
PO : 7	Are able to use modern library searching and retrieval methods to obtain information about a topic, chemical, chemical technique, or an issue relating to chemistry.
PO : 8	Knows the proper procedures and regulations for safe handling and use of chemicals and can follow the proper procedures and regulations for safe handling when using chemicals
PO : 9	Are able to communicate the results of their work to chemists and non-chemists.
PO : 10	Understand the ethical, historic, philosophical, and environmental dimensions of problems and issues facing chemists.
PO : 11	Find gainful employment in industry or government, be accepted at graduate or professional schools (law, medicine, etc.), or find employment in school systems as instructors or administrators.
PO : 12	Are able to pursue Higher education in Chemistry and other disciplines of inter disciplinary

Course outcomes

Analytical Chemistry

CO: 1	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.
CO: 2	It gives fundamental knowledge on chemistry and also on all biological sciences, engineering sciences, health, medicine, pharmaceuticals, environment, industrial processes, quality control and implementation of legislation.
CO: 3	To provide students exposure to chemistry, physics, biological sciences, environmental science, computer application, instrumentation and analytical techniques
CO: 4	After graduating in Analytical Chemistry the students can pursue academics in Chemistry, bioinformatics, forensic science, biochemistry and other disciplines of Inter- disciplinary sciences
CO: 5	Students can also use Analytical Chemistry as a stepping stone to pharmaceutical industry and for Research and Development in industry.
CO: 6	Are able to use modern instrumentation and classical techniques, to design experiments, and to properly record the results of their experiment.

Specific Program Out comes

Analytical Chemistry

SEMESTER –I	**SPO : 1**	Gains knowledge on basic concepts of analytical methods
	SPO : 2	Understands the types of errors in chemical analysis
	SPO : 3	Gains knowledge on principles and applications of Thermo gravimetric methods
	SPO : 4	Gains knowledge on use and handling of Common laboratory apparatus.
SEMESTER –II	**SPO : 1**	Gains knowledge on basic concepts of Gravimetric methods and their importance
	SPO : 2	Gains knowledge on volumetric methods and their importance in Chemical analysis.
	SPO : 3	Gains knowledge on Centrifugation methods
	SPO : 4	Gains knowledge on Environmental and water pollutants and their analysis.
SEMESTER –III	**SPO : 1**	Gains basic knowledge on Separation techniques and their classification.
	SPO : 2	Gains knowledge on Different chromatographic techniques and their applications.
SEMESTER - IV	**SPO : 1**	Gains knowledge on Gas chromatographic technique and their applications.
	SPO : 2	Gains knowledge on Electrophoresis concept and its applications
	SPO : 3	Gains basic knowledge on Filtration techniques.
SEMESTER - V	**SPO : 1**	Gains basic knowledge about Carbohydrates, Proteins & Lipids and their analysis
	SPO : 2	Gains some basic knowledge about Clinical chemistry and Microbiological assay.
	SPO : 3	Gains some basic knowledge and importance of Spectroscopic methods
	SPO : 4	Gains some basic knowledge and importance of Electro analytical methods
SEMESTER - VI	**SPO : 1**	Gains knowledge and awareness about some applied industrial products.
	SPO : 2	Gains knowledge about analysis of cement, Glasses and Gases
	SPO : 3	Gains some knowledge about Industrial standards and Control
	SPO : 4	Gains knowledge on practical Analytical chemistry and its applications in various fields

P. R. GOVERNMENT COLLEGE (A), KAKINADA

B. Sc. (Analytical Chemistry)

SEMESTER –VI

PAPER – VII: ANALYTICAL CHEMISTRY -7

(ELECTIVE)

ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS **45 hrs. (3 h /w)**

UNIT-I

9hrs

ANALYSIS OF SOAPS, DETERGENTS AND PAINTS

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

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

UNIT-II

9 hrs

ANALYSIS OF FATS & OILS AND INDUSTRIAL SOLVENTS

A. **Analysis of oils**: Saponification value, iodine value, acid value, ester value, bromine value, acetyl value.

B. **Analysis of industrial solvents** like benzene, acetone, methanol and acetic acid, Determination of methoxyl and N-methyl groups.

UNIT-III

9hrs

ANALYSIS OF FERTILIZERS, STARCH, SUGARS AND PAPER

A. **Analysis of Fertilizers**: Urea, NPK fertilizer, Super phosphate

B. Analysis of DDT, BHC, Endrin

C. Analysis of Starch, Sugars and Paper

UNIT–IV

9 hrs.

ANALYSIS OF GASES

A. **Analysis of Gases**: Carbon dioxide, carbon monoxide, oxygen, hydrogen, saturated hydro carbons, unsaturated hydrocarbons, nitrogen, Octane number, Cetane number

B. **Analysis of Fuel gases** like: water gas, producer gas.

C. **Ultimate analysis**: Carbon, hydrogen, nitrogen, oxygen, Phosphorus and sulfur.

UNIT–V

9 hrs.

ANALYSIS OF COMPLEX MATERIALS:

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

B. **Analysis of glasses** - Determination of silica, Sulphur, barium, arsenic, antimony, total R_2O_3, calcium, magnesium, total alkalis, aluminum, chloride, fluoride

P. R. GOVERNMENT COLLEGE (A), KAKINADA

B. Sc. (Analytical Chemistry)

SEMESTER –VI

PAPER – VII: ANALYTICAL CHEMISTRY -7

(ELECTIVE)

Practical-VII Analysis of Applied Industrial Products **30** hrs. (2 h /w) Max.Marks : 50 M

Analysis of Heavy & Fine Chemicals:

1. Preparation of soaps and detergents.
2. Assay of soaps and detergent
3. Determination of Na/K/Li/Ca in given sample by flame photometry method.
4. Preparation and characterization of copper sulphate.
5. Preparation and characterization of methyl orange and methyl red.
6. Estimation of $Na_2CO_3.10H_2O$ in washing soda.
7. Determination of total hardness (Ca^{+2}& Mg^{+2}) present in the water sample
8. Determination of Chloride(Cl^{-}) content present in the water sample
9. Determination of concentration of Calcium present in the milk powder by complexometric titration with EDTA
10. Determination of Calcium and Magnesium present in the Limestone or Dolomite Samples
11. Determination of Ammonia from ammonia containing fertilizer

SUGGESTED 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. Taraporavala &sons,
5. G.Z. Weig - Analytical methods for pesticides, plant growth regulators and food additives - Vols I to VII,
6. Analytical Agricultural Chemistry by S.L. Chopra & J.S. Kanwar – Kalyani Publishers
7. F.J. Welcher-Standard methods of analysis,
8. Quantitative analysis of drugs in pharmaceutical formulations by P.D. Sethi, CBS Publishers and Distributors, New Delhi
9. G. Ingram- Methods of organic elemental micro analysis- Chapman and Hall.

SCHEME OF VALUATION

Max. Marks: 50

I.	Procedure to be written in the first 15 minutes	....	10 Marks
II.	Recording of data and reporting the value upto 2% error.....		20 Marks
III.	Error up to 5%	.....	10 Marks
	Error greater than 5%	.....	5 Marks
IV.	Viva – Voice	.....	10 Marks
V.	Record	.....	10 Marks

P. R. GOVERNMENT COLLEGE, KAKINADA
MODEL QUESTION PAPER
SEMESTER – VI
Paper - VII (ANALYTICAL CHEMISTRY-7)
ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS
(EECTIVE)

Duration: 2hrs. 30Min. **Max. Marks: 60**

SECTION – A

Answer any **FOUR** questions. Each question carries **10** marks. 4 X 10 = 40M

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

SECTION – B

Answer any **four** questions. Each question carries **5** marks. 4 x 5 = 20M

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

P. R. GOVERNMENT COLLEGE, KAKINADA
SEMESTER – VI
Paper - VII (ANALYTICAL CHEMISTRY-7)
ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS
(EECTIVE)

Duration: 2hrs. 30Min. **Max. Marks: 60**

Blue Print:

S. No.	Course Content	Essay Questions (10M)	Short Answer Questions (5M)	Total No. Of Questions from each Unit
1	Unit -I	1	1	2
2	Unit –II	1	2	2
3	Unit –III	2	2	4
4	Unit –IV	2	1	4
5	Unit -V	2	2	4
	TOTAL	8	8	16

Note: Questions should be given from Question bank only

P. R. GOVERNMENT COLLEGE, KAKINADA
SEMESTER – VI
Paper - VII (ANALYTICAL CHEMISTRY-7)
ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS
(EECTIVE)

Duration: 2hrs. 30Min. **Max. Marks: 60**

Question Bank:

Essay Questions: 10 M

1. How do you analyze lead chromate and zinc chromate present in paints?
1. How do you determine the total fatty matter and free alkali of soaps?
2. Describe the analysis of benzene.
3. Explain about the analysis of Oils
4. Explain about the analysis of NPK fertilizers
5. Write about the analysis of DDT and BHC
6. Write about the analysis of starch, paper analysis.
7. Explain about the analysis of CO_2 and saturated hydrocarbons
8. Write about the analysis of water gas and producer gas
9. Write about the ultimate analysis of C and H
10. Write about the analysis of total silica and lime content in cement
11. Explain about the analysis of cement
12. Write about the analysis of silica and total alkalis in glasses.
13. Explain about the analysis of glass

Question Bank:

Essay Questions:05 M

1. Explain about the analysis of Sodium silicate in soaps
2. Explain about the analysis of $BaSO_4$ in paints
3. Write about the analysis of Iodine value in oils
4. Explain about the analysis of acid value in oils
5. Explain about the determination of methoxyl group in industrial solvents
6. Explain about the determination of N-Methyl group in industrial solvents.
7. Write about the analysis of Urea
8. Explain about the analysis of Super phosphate
9. Write about the analysis of DDT
10. Explain about the analysis of endrin.
11. Write about the analysis of sugars
12. Explain about the analysis of paper
13. Explain about octane number
14. Write about cetane number
15. Write about the analysis of water gas.
16. Write about the analysis of sulphuric anhydride in cement
17. Explain about the analysis of ferric oxide content in cement
18. Explain about the determination of calcium in Glasses
19. Explain about the determination of magnesium in Glasses
20. Explain about the determination of Sulphur in Glasses
21. Write about the composition of cement
22. Write about the composition of glass

CLUSTER ELECTIVES:

Cluster Elective – I Analytical and Physical Chemistry

SEMESTER-VI

PAPER – VIII-A-1: POLYMER CHEMISTRY **45 hrs. (3 h / w)**

UNIT-I **12h**

Introduction of polymers:

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

UNIT-II **10h**

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 **6h**

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

UNIT-IV **9h**

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 **8h**

Polymers and their applications:

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

SEMESTER-VI

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

45 hrs. (3 h / w)

UNIT –I

Introduction to spectroscopic methods of analysis: **4 h**

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

UNIT – II: **Molecular spectroscopy:** **8h**

Infrared spectroscopy:

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

UNIT–III **10h**

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

UNIT – IV: **Separation techniques**

Chromatography: Gas chromatography, liquid chromatography, supercritical fluids, Importance of column technology (packing, capillaries), Separation based on increasing number of factors (volatility, solubility, interactions with stationary phase, size, electrical field), Detection: simple vs. specific (gas and liquid), Detection as a means of further analysis (use of tags and coupling to IR and MS), Electrophoresis (plates and capillary) and use with DNA analysis. 46 Immunoassays and DNA techniques **8h**

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

UNIT – V

Elementalanalysis:10 hr.

Mass spectrometry (electrical discharges).

Atomic spectroscopy: Atomic absorption, Atomic emission, and Atomic fluorescence. Excitation and getting sample into gas phase (flames, electrical discharges, plasmas), Wavelength separation and resolution (dependence on technique), Detection of radiation (simultaneous/scanning, signal noise), Interpretation (errors due to molecular and ionic species, matrix effects, other interferences).

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

Electro analytical Methods: Potentiometry &Voltammetry

Radiochemical Methods: ray analysis and electron spectroscopy (surface analysis)

SEMESTER-VI

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

45 hrs. (3 h / w)

UNIT- I

Analysis of the following drugs and pharmaceuticals preparations: (Knowledge of molecular formula, structure and analysis) Analysis of analgesics and antipyretics like aspirin and paracetamol Analysis of antimalarial like chloroquine.

Analysis of drugs in the treatment of infections and infestations: Amoxicillin. Chloramphenicol, metronidazole, penicillin, tetracycline, cephalexin(cephalexin).

Anti-tuberculosis drug- isoniazid.

UNIT - II

Analysis of the following drugs and pharmaceuticals preparations: (Knowledge of molecular formula, structure and analysis)

Analysis of antihistamine drugs and sedatives like: allegra, Zyrtec(citirizine), alprazolam, trazodone, lorazepem, ambien(zolpidem), diazepam,

UNIT - III

Analysis of anti-epileptic and anti convulsant drugs like phenobarbital and phenacemide. Analysis of drugs used in case of cardiovascular drugs: atenolol, Norvasc(amlodipine), Analysis of Lipitor(atorvastatin) a drug for the prevention of production of cholesterol.

Analysis of diuretics like: furosemide (Lasix), triamterene

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

UNIT -IV

Analysis of Milk and milk products: Acidity, total solids, fat, total nitrogen, proteins, lactose, phosphate activity, casein, chloride. Analysis of food materials- Preservatives: Sodium carbonate, sodium benzoate sorbic acid Coloring matters, - Brilliant blue FCF, fast green FCF, tertrazine, erythrosine, sunset yellow FCF.

Flavoring agents - Vanilla, diacetyl, isoamyl acetate, limonene, ethyl propionate, allyl hexanoate and Adulterants in rice and wheat, wheat floo0r, sago, coconut oil, coffee powder, tea powder, milk.

UNIT - V

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

Cluster Elective –II

Fuels and Industrial Inorganic materials

PAPER – VIII-B-1: FUEL CHEMISTRY AND BATTERIES

45 hrs. (3 h / w)

UNIT–I **12h**

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

UNIT-II 6h

Petroleum and petrol chemical industry:

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

UNIT-III **10h**

Fractional distillation (principle and process), cracking (Thermal and catalytic cracking). Reforming petroleum and non-petroleum fuels (LPG, CNG, LNG, biogas)

, 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 10h

Lubricants:

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

UNIT-V 7h

Batteries:

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

PAPER – VIII-B-2:

INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE

45 hrs. (3 h / w)

UNIT - I

Recapitulation of *s*-and *p*-Block Elements **8h**

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 **15h**

Silicate Industries

Glass: Glassy state and its properties, classification (silicate and non-silicate glasses). Manufactureandprocessingofglass.Compositionandpropertiesofthefollowingtypesof 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 fiber.

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

UNIT –III **8h**

Fertilizers:

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

UNIT–IV **8h**

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 **6h**

Alloys:

Classification of alloys, ferrous and non-ferrous alloys, Specific properties of elements in alloys. Manufacture of Steel (removal of silicon decarbonization, demagnetization, 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 inorganic compounds, preparation and explosive properties of lead azide, PETN, cyclonite (RDX). Introduction to rocket propellants.

PAPER – VIII-B-3:

IPR, QA & QC and Regulatory Affairs 45hrs (3h/w)

UNIT-I: **9hrs**

INTELLECTUAL PROPERTY RIGHTS:

Concept and fundamentals of IPR, need and economic importance of IPR, detail description of various IP Properties (Patents, Trademarks, Copyrights, Geographical Indications Industrial Designs and Trade secrets), IPR with emphasis on patent regime, factors affecting IP protection, penalties for violation or infringement, trade related aspects of IPR, concepts behind GATT, WTO, TRIPS, TRIMS and GATS.

UNIT-II: **9hrs**

R & D AND TECHNOLOGY TRANSFER:

Role of R&D, functional structure of R&D, unit research strategies and manufacturing interface, laboratory-industry interface, technology transfer

Pilot Plant Operation and Scale up:

Purpose planning, design and operation, analysis of results, assessment of flexibility of design comprises to cope-up for safety and economic in construction and operation.

UNIT-III: **9hrs**

QUALITY CONTROL:

Concept of quality and quality control, nature of variability's, design of QC laboratory for chemical, instrumental and microbiological laboratories, schedule L1, standardization of reagents, labeling of reagents, control samples, data generation and storage, QC documentation, LIMS sampling techniques, sampling plans, steps to improve quality with reference to ISO and TQM, preparation of control charts, sampling, inspection, cost reduction &quality improvement.

UNIT-IV: **9hrs**

QUALITY ASSURANCE:

Concepts of Quality Assurance, Total Quality Management, Philosophy of GMP and cGMP, preparation of audit, conducting audit, Audit Analysis, Audit Report and Audit follow up. Premises: Location, design, plant layout, construction, maintenance of sterilite areas, control of contamination.

UNIT-V: **9hrs**

INDUSTRIAL STANDARDS ANDCONTROL:

Government standards like Agmark, Hallmark, ISI, MINAS, IP, BP, USP; an introduction of ISO, OSHA, CDSCO, USFDA, ICH, FPO, MHRA, SUPAC.

Cluster Elective –III

SEMESTER - VI

PAPER – VIII-C-1

ORGANIC SPECTROSCOPIC TECHNIQUES

45 hrs. (3 h / w)

UNIT-I **10h**

NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY

Nuclear spin, Principles of NMR Magnetic moment and Spin angular momentum. Larmour Frequency. Instrumentation. Relaxation- spin-spin & spin lattice relaxation. Chemical shifts, Shielding and Deshielding Mechanism-Factors influencing Chemical shift. Spin-Spin interactions- AX, AX_2 and AB types. Vicinal, Geminal and Long range coupling- Factors influencing coupling constants.

UNIT–II 5h

Spin decoupling, Spin tickling, Deuterium exchange, Chemical shift reagents and nuclear over Hauser effect. Applications in Medical diagnostics, Reaction kinetics and Mechanically induced dynamic nuclear polarization. FT NMR and its Advantages.

UNIT-III **10h**

UV & VISIBLE SPECTROSCOPY

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

UNIT-IV **5h**

Chemical analysis by Electronic Spectroscopy – Beer-Lambert's Law. Deviation from Beer's law. Quantitative determination of metal ions (Mn^{+2}, Fe^{+2}, NO_2^-,). Simultaneous determination of Chromium and Manganese in a mixture

UNIT-V **15h**

Electron Spin Resonance Spectroscopy

Basic Principles, Theory of ESR, Comparison of NMR & ESR. Instrumentation, Factors affecting the 'g' value, determination of 'g' value. Splitting hyper fine splitting coupling constants. Line width, Zero field splitting and Kramer degeneracy.

Applications: - Detection of free radicals;

ESR spectra of

(a) Methyl radical ($CH_3^{\cdot}$),

(b) Benzene anion ($C_6H_6^{-}$)

(c) $CH_2.CH_3$ (ETHYL RADICAL)

REFERENCE BOOKS:

1. Electron Spin Resonance Elementary Theory and Practical Applications- John E. Wertz and James R. Bolton, Chapman and Hall,1986.
2. Spectroscopic Identification of organic compounds – Silverstein, Basseler and Morri.
3. Organic Spectroscopy- William Kemp.
4. Fundamentals of Molecular Spectroscopy- C.N. Banwell and E.A. Mc cash 4thEdition, Tata Mc Graw Hill Publishing Co., Ltd.1994.
5. NMR, NQR, EPR and Mossbauer Spectroscopy in inorganic chemistry – R.V Parish, Ellis, Harwood.

P. R. GOVERNMENT COLLEGE, KAKINADA
MODEL PAPER FOR SEMESTER – VI (CHEMISTRY)
Paper - VIII: CLUSTER-C-1: ORGANIC SPECTROSCOPIC TECHNIQUES

Duration: 2.30 hrs. **Max. Marks: 60**

Answer any **FOUR** questions choosing **AT LEAST ONE** question from each section

4X10=40Marks

Section-I

1. i. Which type of atoms exhibit nuclear magnetic resonance?
   ii. Write the principle involved in NMR spectroscopy.
2. Define chemical shift. What are the factors influencing chemical shift?
3. Discuss in detail about the nuclear over Hauser effect.

Section-II

4. Write about Born-oppenheimer approximation.
5. What are the Woodward-Fieser rules of UV-Visible spectroscopy?
6. How is Beer-Lambert's law useful in quantitative determination of Mn (II) and Fe (II)?

Section-III

7. Give the experimental procedure of simultaneous determination of chromium and manganese in a mixture using Beer-Lambert's law.
8. Explain the principle and experimental techniques involved in ESR studies.
9. Write notes on 'g' value and hyperfine structure.

Section-IV

Answer any **FOUR** questions. Each question carries **FIVE** marks. **4X5=20Marks**

10. Describe the factors influencing the coupling constant.
11. Explain about spin decoupling.
12. Write about Franck-Condon principle.
13. What are the different types of electronic transitions?
14. State and explain Beer-Lambert law.
15. Write the quantitative determination of any metal ions.
16. How ESR studies are useful to study the structure of free radicals?
17. How ESR studies are useful to study the structure of benzene anion?

SEMESTER - VI

PAPER – VIII-C-2

ADVANCED ORGANIC REACTIONS.

45 hrs. (3 h / w)

UNIT – I

ORGANIC PHOTOCHEMISTRY

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

ORGNAIC PHOTOCHEMISTRY

Norrish cleavages, type I: Mechanism, acyclic cyclic diones, 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, Decomposition of nitrites – Barton reaction.

UNIT – III

PROTECTING GROUPS AND ORGANIC REACTIONS

Principles of (1) Protection of alcohols – ether formation including silyl ethers – ester formation, (2) Protection of diols – acetyl and, ketal, (3) Protection of carboxylic acids–ester formation, benzyl and t–butyl esters, (4) Protection of amines

– Acetylation, benzoylation, benzyloxy carbonyl, triphenyl methyl groups, (5) Protection of carbonyl groups – acetyl, ketal, 1, 2–glycolsand1, 2–dithio glycols formation.

UNIT – IV

Synthetic reactions: Mannich reaction – Mannich bases – Robinson annulations. The Shapiro reaction, Stork–enamine reaction. Phase transfer catalysis – mechanisms and use of benzyl trialkyl ammonium halides. Witting reaction.

UNIT –V:

NEW SYNTHETIC REACTIONS

Baylis–Hillman reaction, Mitsunobu reaction, McMurrey reaction, Julia–Lythgoe olefination, and Peterson's stereo selective olefination, Heck reaction, Suziki coupling, Stille coupling and Sonogishira coupling, Buchwald–Hartwig coupling. Ugi reaction, Click reaction

P. R. GOVERNMENT COLLEGE, KAKINADA

MODEL PAPER

SEMESTER – VI (CHEMISTRY)

Paper - VIII: CLUSTER-C-2

ADVANCED ORGANIC REACTIONS

Duration: 2.30 hrs. **Max. Marks: 60**

Answer any **FOUR** questions choosing **AT LEAST ONE** question from each section **4X10=40Marks**

Section-I

1. Write the mechanism of photo reduction reaction? How it is affected by temperature and solvent?
2. Explain the following:
   i) Singlet and triplet states ii) Jablonski diagram
3. Discuss the Norrish Type-I cleavage with an example.

Section-II

4. What do you know about the following:
   i) Di-π methane rearrangement ii) Barton reaction
5. Give a detailed account on the protection of carbonyl groups.
6. How amine group is protected by acylation and benzoylation.

Section-III

7. Write note on the following:
   i) Mannich reaction ii) Wittig reaction
8. Write a note on the following:
   i) Use of benzyl trialkyl ammonium halides ii) Phase transfer catalysis
9. Illustrate the following reactions:
   i). Baylis-Hillman reaction ii) Heck reaction

Section-IV

Answer any **FOUR** questions. Each question carries **FIVE** marks. **4X5=20Marks**

10. Write notes on inter-system crossing.
11. Explain the nature of hydrogen donors in photochemical reactions
12. Explain about Photo Fries rearrangement.
13. Give a brief account on the protection of carboxylic acids by ester formation.
14. How does carbonate formation protect diols?
15. Write about Robinson annulation.
16. What is Stork-enamine reaction?
17. Write about Buchwald–Hartwig coupling

SEMESTER -VI
PAPER – VIII-C-3
PHARMACEUTICAL AND MEDICINAL CHEMISTRY

45 hrs. (3 h / w)

UNIT-I **8h**

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

UNIT-II

Drugs: **8h**

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

UNIT-III

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

a. Chemotherapeutic Drugs

1.Sulphadrugs (Sulpha methoxazole) 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: **8h**

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

4. Diuretics(Furosemide)

UNIT-V

HIV-AIDS: **9h**

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

P. R. GOVERNMENT COLLEGE, KAKINADA
MODEL PAPER FOR SEMESTER – VI (CHEMISTRY)
Paper - VIII: CLUSTER-C-3: PHARMACEUTICAL & MEDICINAL CHEMISTRY

Duration: 2.30hrs. **Max. Marks: 60**

Answer any **FOUR** questions choosing **AT LEAST ONE** question from each section

4X10=40Marks

Section-I

1. Give a detailed account on pharmacodynamics and pharmacokinetics.
2. Explain the following terms with suitable examples.
   i) Metabolites ii) Anti-metabolites
3. How drugs are classified according to their structure?

Section-II

4. Discuss the classification of drugs based on therapeutic activity.
5. Write about the synthesis of chloroquine.
6. Write about the synthesis and therapeutic activity of paracetamol.

Section-III

7. Write about the synthesis of salbutamol.
8. What do you know about CD-4 and CD-8 cells?
9. What are the drugs available for prevention of AIDS? Give their structures.

Section-IV

Answer any **FOUR** questions. Each question carries **FIVE marks.** **4X5=20Marks**

10. Define pharmacy and pharmacology.
11. Define pharmacophore and give two examples.
12. Write the clinical, generic and trade names of paracetamol.
13. Describe the types of administration of drugs.
14. Write about the therapeutic activity of chloroquine.
15. Write the preparation method and uses of antiuritics.
16. Define hypnotics and antipyretics.
17. Write notes on retrovirus.

LABORATORY COURSE –VIII

Practical Paper – VIII- C1

(CUSTER ELECTIVE -1)

(At the end of semester VI) 30 hrs. (2 h /W) Max.Marks: 50 M

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

LABORATORY COURSE – IX

Practical Paper – VIII – C2

(CUSTER ELECTIVE -1I)

(At the end of semester VI) 30 hrs. (2 h / W) Max.Marks: 50M

1. Green procedure for organic qualitative analysis: Detection of N, S and halogens
2. Acetylation of 1^0 amines 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

LABORATORY COURSE – X

Practical Paper – VIII – C3

(CUSTER ELECTIVE -1II)

(At the end of semester VI) **Max.Marks:50 M**

30 hrs. (2 h / W)

Practical Paper: VIII-C-3 Practical

Project Work

Project work	...	40	Marks
VIVA	...	10	Mar