PITHAPUR RAJAH'S GOVERNMENT COLLEGE
(AUTONOMOUS)

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

Affiliated to Adikavi Nannaya University

NAAC Accredited with "A" Grade (3.17 CGPA)

BOARD OF STUDIES OF CHEMISTRY

B.Sc. ANALYTICAL CHEMISTRY Under CBCS

Meeting Minutes/Resolutions

Convened on 31 AUGUST, 2023

DEPARTMENT OF ANALYTICAL CHEMISTRY
PITHAPUR RAJAH'S GOVT. COLLEGE (Autonomous)

Opp. Mc Lauren High School, Raja Ram Mohan Roy Road,

Kakinada

WWW.PRGC.AC.IN; E-MAILCHEMISTRY_DEPT@PRGC.AC.IN

PROCEEDINGS OF THE PRINCIPAL,
PITHAPUR RAJA'S GOVERNMENT COLLEGE (A) KAKINADA- A.P
Present: Dr. B. V. Tirupanyam, M. Sc; Ph.D.
R.C.No.1/A.C./BOS/2023-24, Dated: 29.08.2023

SUB: PITHAPUR RAJA'S Government College (A), Kakinada-UG Board of Studies (BOS)- B.Sc- Analytical Chemistry- Nomination of Members-Orders issued.

REF: 1. UGC Guidelines for Autonomous Colleges-2018.

ORDERS:

The Principal, P.R. Government College (A), Kakinada is pleased to constitute UG Boards of Studies in

ANALYTICAL CHEMISTRY for framing the syllabi in respective Subject for all Semesters duly following

the norms of the UGC Autonomous guidelines.

S. No	Name of the Person	Designation
1	V. Sanjeeva Kumar	Chairman & Lecturer Incharge
2	Dr. K. Jhansi Lakshmi ASD Govt. Degree College for Women (Autonomous) Kakinada	University Nominee
3	Dr. D. Chenna Rao Lecturer in Chemistry, Govt. Degree College, Yeleswaram	Subject Expert –I
4	U. Sai Krishna Lecturer in Chemistry, Govt. College, (Autonomous) Rajamahendravaram	Subject Expert – II
5	Dr. B. Ramesh Babu Founder & M.D., BogaR laboratories, Peddapuram.	Representative from Industry
6	T. V. V. Satyanarayana	Member
7	P. Vijay Kumar	Member
8	V. Ram babu	Member
9	G. Pavani	Member
10	Dr. N. Bujji Babu	Member
11	Dr. Ch. Praveen	Member
12	V. Venkateswara Rao	Member
13	U.S.N. Prasad	Member
14	B. Bhavani	Member
15	G. Surya Priya	Student Alumni Member
16	B. Balaji III MCAC	Student Member

17	R. Aditya Naidu III MCAC	Student Member
18	R Renuka II MCAC	Student Member

The above members are requested to attend the BoS meeting on 31-08-2023 and share their valuable reviews, and suggestions on the following functionaries.

- 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 IQAC and Academic Council.
- Suggested methodologies for innovative teaching and evaluation techniques.
- Suggest the panel of Names to the academic council for appointment of Examiners.
- Coordinate research, teaching, extension and other activities in the Department of the college.

PRINCIPAL
P. R. Government College(A),
Kakinada

VISION AND MISSION OF COLLEGE

Vision

To provide the right academic environment paving way for intellectual excellence, humane feelings and social commitment.The college believes in providing quality education for the socially disadvantaged, economically weaker sections of the society and thereby help them move up the ladder of success and social order.

Mission

- To impart holistic education with special emphasis on Character, culture, updated knowledge and skill-oriented learning.
- To make the students enjoy the fruits of globalization without prejudice to their local and cultural environment.
- To impart necessary life skills so as to make them face any challenge in the bigger world – Social, ethical, psychologicalor professional.

PITHAPUR RAJAH'S GOVT.COLLEGE (A), KAKINADA

DEPARTMENT OF ANALYTICAL CHEMISTRY

Minutes of board of studies (BOS) meeting

2023-24 On 31st, Aug,2023

Meeting of Board of Studies in analytical chemistry is convened on **31st, Aug,2023** through offline at PITHAPUR RAJAH'S GOVT.COLLEGE (A), KAKINADA

Venue: Conference Hall, Dt: **31st, Aug,2023**

- The Principal Dr. B.V. Tirupanyam,
- Chairman, Sri. V. Sanjeeva Kumar, Chairman and lecturer in charge,
- University Nominee: Dr. D. Chenna Rao, Lecturer in Chemistry, Govt. Degree College, Yelleswaram
- University Nominee: Dr. K. Jhansi Lakshmi, Lecturer in Chemistry, ASD Govt. Degree College women's (Autonomous),Kakinada.
- Industrialist Dr. B. Ramesh Babu, Founder & M.D., Boger laboratories,Peddapuram,
- Subject Expert: Sri. U. Sai Krishna Lecturer in Chemistry, Government Degree CollegeRajamahendravaram

All the faculty members of Chemistry Department and student alumniattended the meeting

Agenda:

- To discuss the Semester System and Choice Based Credit System (CBCS) being implemented forthe past 06 years, i.e., w.e.f. 2015-16.
- To discuss and approve the Continuation/Modifications of the syllabus for the Odd & EvenSemesters of I, III & V Years for 2023-24.
- Grant of Extra credits for Online SWAYAM MOOCs etc.
- Syllabus, Model Question Papers and Model Blue Prints for I, II, III, IV, Vand VI Semesters.
- Teaching learning methodology by 50:50 (External: Internal) ratio for the present II- and III-Year Students and 50:50 (External: Internal) ratio I Year Students w.e.f. 2022-23.
- Panel of paper setters and examiners.
- Proposals for Community Service Projects/Extension activities for the benefit of the society.
- Department action plan for 2023-24.

RESOLUTIONS:

The following agenda items are discussed and resolutions are made.

- It is resolved to continue choice-based credit system in the chemistry combination programmes asper the directions of the CCE, Vijayawada to the first year and second year and final year student's w.e.f. 2018-19.
- It is resolved to approve the Continuation/Modifications of the syllabus for the Odd & Even Semestersof I, II & III Years for 2021-22.
- 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)
- It is resolved to follow 50%-50% external and internal for first year w.e.f 2021-22 admitted batch.
- It is resolved that every student should maintain 75% attendance for both theory and practical's in order to attend the Mid and Semester examination.
- It is resolved to conduct departmental activities such as OZONE DAY, CHEM FEST, CHEMISTRY DAYand SCIENCE DAY. (Annexure-I)

- It is resolved to implement the recommended andragogy for the first semester2023-24
- Resolved to conduct practical examinations semester wise.
- It is resolved to organize guest lectures by eminent professors.
  Resolved to implement pass minimum for internal assessment for CBSE patternstudents as the pattern is learner oriented.
- It is resolved to maintain status quo for same question paper pattern in II, III years.The following paper setters are recommended

Resolutions:

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

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS
I	I	I	Basic Principles & Laboratory Operations	100 50:50	04
			Practical – I	50	01
	II	II	Quantitative Methods Of Analysis	100 50:50	04
			Practical – II	50	01
II	III	III	Separation Methods – I	100 50:50	04
			Practical – III	50	01
	IV	IV	Separation Methods – II	100 50:50	04
			Practical – IV	50	01
		V	Analytical, Biochemistry and Environmental Chemistry	100 50:50	04
			Practical – V	50	01
III	V	VI	Instrumental Methods of Analysis	100 50:50	04
			Practical – VI	50	01
		VII	Analysis of Applied Industrial Products	100 50:50	04
			Practical – VII	50	01

B.Sc. Analytical chemistry

Syllabus & Model papers

Question Bank

	Pithapur Rajah's Government College (Autonomous) Kakinada	**Program & Semester** **III B.Sc. Mathematics, Chemistry, Analytical chemistry** **Semester-V (P-VI)**			
Course Code	**INSTRUMENTAL METHODS OF ANALYSIS-VI**				
Teaching	**Hours Allocated: 60 (Theory)**	**L**	**T**	**P**	**C**
Pre-requisites:	Spectroscopic methods: UV-VISIBLE, IR, ATOMIC EMISSION, ATOMIC ABSORPTION,POLOROGRAFY AND BASIC ELECTO-ANALYTICAL CHEMISTRY	60	10	30	4+1

Course Objectives:

1. To gain knowledge on spectroscopy and electro analytical chemistry.
2. Gains basic knowledge on Separation techniques and their Classification.
3. Gains knowledge on Different chromatographic techniques and their applications.

Course Outcomes:

On Completion of the course, the students will be able to…	
CO1	Understand the basic principles of UV-Vis and IR Spectroscopy
CO2	In Depth understanding of atomic emission spectroscopy and absorption spectroscopy
CO3	Learn the applications of Polarography, basic principles of electro analytical chemistry.

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development			Employability			Entrepreneurship	

UNIT 1:

UV - VISIBLE SPECTROPHOTOMETRY: 9HRS

Principle, Lambert-Beer's law and its deviations, UV– Visiblespectrophotometer Instrumentation – sources, detectors, Single and double beam spectrophotometers and its applications

IR SPECTROSCOPY: Principle, Instrumentation – Sources, detectorsand applications

Unit 2:

ATOMIC EMISSION SPECTROSCOPY (Flame photometry): 9hrs

Principle – Instrumentation – Interferences – Analytical techniques for Flame photometry – Calibration plots (Working curves). Applications -Determination of Alkali and Alkaline earth metals in natural water

Unit 3:

ATOMIC ABSORPTION SPECTROSCOPY: AAS 9hrs

Principle – Instrumentation – Radiation sources (line sources) – Hollow cathode lamps and Discharge lamps. Interferences – Analytical techniques for AAS – Calibration plots. Applications –Determinations of Calcium and Magnesium in tap water.

Unit4:

POLOROGRAPHY AND COULOMETRY: 9hrs

Instrumentation, Dropping mercury electrode (DME), advantages and disadvantages of DME, Qualitative and quantitative analysis of inorganic ions. Basic Principles of Polarography, residual current, migration current, diffusion current, half wave potential, Ilkovic equation.

Coulometry:

Types of coulometric methods: Potentiostatic and amperostatic; principles, instrumentation and application

Unit-V 9hrs

Electrochemical cells, Electrode potentials, cell potentials, Nernst equation, Determination of EMF of cell, Applications of EMF measurements – Potentiometrictitrations.

Ion selective electrodes: Reference electrodes – Hydrogen electrode, Calomel electrode, silver chloride electrode. Indicator electrodes –Hydrogen and glass electrodes, Metal –metal ion electrode, inert electrode, Applications of ion selective electrodes.

Text Books

S NO	AUTHOR	TITLE	PUBLISHER
1	B K Sarma	Instrumental methods of analysis	Goel publishing house, meerut
2	Gurudeep R Chatwal andAnand	Instrumental methods of analysis	Himalaya publishing house

Reference Books

S NO	AUTHOR	TITLE	PUBLISHER
1	Peter Atkins	Physical Chemistry	Oxford university press
2	H H Willard,Meritt and J A Dan	Instrumental methods of analysis	C B S Publisher and Distributors
3	Welcher	Standard Methods of chemical analysis	Krieger publishing company

Weblink's:

1. https://youtu.be/3olOk_xNq8g
2. https://youtu.be/m8LSsdRafLo
3. https://youtu.be/ck0qEruFy_o

Course Outcomes

CO-1	Understand the basic principles of UV-Vis and IR Spectroscopy
CO-2	In Depth understanding of atomic emission spectroscopy and absorption spectroscopy
CO-3	Learn the applications of Polarography, basic principles of electro analytical chemistry.

Program Outcomes

PO1 : Knowledge in Chemistry : Apply the basic knowledge of UV-Vis and IR Spectroscopy to the structural elucidation of simple to complex molecules

PO2: Problem analysis: Identify, formulate, review research literature, and analyze simple to complex problems reaching substantiated conclusions using fundamental principles of atomic emission spectroscopy and absorption spectroscopy

PO3: Design/development of solutions: Design solutions for simple to complex problems designing novel routes for understanding the structure of organic molecules by spectroscopy.

PO4: Conduct investigations of complex problems: Use fundamental research-based knowledge and available research methods including design of experiments, analysis and interpretation of data.

PO5 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for modeling and interpretation of simple to complex organic molecules by Polarography, basic principles of electro analytical chemistry.

PO6 : The Chemist & Society: Applying the contextual knowledge to assess societal, health, safety, legal and cultural issues.

PO7: Environment and sustainability: Understand the importance of basic electro analytical chemistry for various solutions in societal and environmental context and demonstrate the knowledge and need for sustainable development.

PO8 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the science-based practice.

PO9 : Communication: Communicate effectively on complex Chemical activities with the Chemistry community and with society at large, such as, being able to comprehend and write effective reports, design documentation and make effective presentations

PO10: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES

PSO-1: To analyze the structural problems in Chemistry by using principles of spectroscopy.

PSO-2: Applying the knowledge of Atomic spectroscopy to analyse and interpret data to obtain valid conclusions in respect of metals.

PSO-3: Use of various basic electrochemical simulation tools to determine the EMF of the cells.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO1	3	0	2	2	0	1	0	1	1	1	3	1	0
CO2	0	3	1	2	0	1	1	1	1	1	1	3	0
CO3	0	0	0	2	3	1	3	1	1	1	0	0	3

CO-PO Mapping

Low =1 ; Moderate = 2 ; High = 3 ; No Correlation = 0

Weightage to content

Semester –V

Paper-VI

S. NO	Course Content	Long Answer	Short Answer	Total marks	As per Blooms Taxonomy
1	UV-VISIBLE and IR Spectroscopy	2	1	25	Understanding, Application
2	Atomic Emission Spectroscopy	1	1	15	Remembering , Understanding
3	Atomic Absorption Spectroscopy	1	1	15	Understanding , Applications
4	Polarography and Coulometer	1	2	20	Remembering, Understanding
5	Basic Electro-Analytical Chemistry	1	2	20	Application & Creation
	TOTAL	**6**	**7**	**95**	

P. R. GOVERNMENT COLLEGE, KAKINADA

MODEL QUESTION PAPER

SEMESTER-V Paper - VI (ANALYTICAL CHEMISTRY-6)

INSTRUMENTAL METHODS OF ANALYSIS

Duration: 2hrs Max. Marks: 50M

SECTION – I

Answer any THREE of the following questions and attempt one question from the each part from the section and each question carries 10 marks

PART-A

3X 10 = 30M

1. State and explain Beer-Lamberts Law and its Limitations
2. Determination alkali and alkaline Earth metals in Natural waters by Flame Photometry
3. Explain about the principle and instrumentation of AAS

PART-B

4. Explain about the following a) Ilkovic equation b) dropping mercury electrode

5. Write about potentiometric titration

6. Explain single and double beam spectrophotometers with neat block diagrams

SECTION – II

Answer any FOUR of the following questions .Each carries 5marks 5X 4 = 20M

7. What are the applications of UV-Visible spectrophotometry
8. Briefly explain principle of Flame photometry
9. Describe about the HCL (Hollow Cathode Lamp)
10. Explain the principle of Coulometer
11. Explain about Glass Electrode
12. Write about electrochemical cells
13. Explain about residual and migration current

P.R. GOVT COLLEGE (A), KAKINADA
SEMESTER – V
Paper - VI (ANALYTICAL CHEMISTRY-6)
INSTRUMENTAL METHODS OF ANALYSIS

Duration: 2hrs. Max. Marks: 50

Question Bank

Essay Questions: 10M

UNIT-I

1. State and Explain Beers –Lamberts law and explain the principle of UV – Visible spectroscopy.
2. Explain about the instrumentation and applications of UV –Visible spectrophotometer.
3. Write about the principle and instrumentation of IR Spectroscopy.
4. Explain about Single beam and double beam spectrophotometers

UNIT-II

5. Explain about the Principle and instrumentation of Flame photometry
6. Explain about the following,

i. Determination of alkali and alkaline earth metals in natural waters by flame photometry

ii. Calibration plots in Flame photometry

UNIT-III

7. Explain about the principle and instrumentation of atomic absorption spectroscopy (AAS)
8. Explain about the following, i. Determination of Calcium and Magnesium in tap water by AAS ii. Calibration plots in AASS

UNIT-IV

9. Explain about the principle and instrumentation of Polarography technique
10. Explain about the following, i. Ilkovic equation ii. Dropping mercury electrode
11. Explain about the potentiostatic coulometer technique
12. Explain about the amperiostatic coulometer technique

UNIT-V

13. Explain about the Nernst equation and its applications
14. Write about potentiometric titrations
15. Explain about the following,

I). Reference electrodes ii). Indicator electrodes

16. Explain about the ion selective electrodes and write its application

Question Bank:

Short Answer Questions: 05 M

UNIT-1

1. State Beers – Lamberts law and write its deviations
2. Explain about the photo multiplier tube detector used in Spectrophotometer
3. Write the advantages and dis advantages of double beam Spectrophotometer over single beam spectrophotometer
4. Write the applications of IR spectroscopy

UNIT-II

4. Explain about the interferences and its eliminations in Flame photometry
5. Explain about the calibration plots in Flame photometry
6. Write about the applications of Flame photometry

UNIT-III

7. Explain about the radiation sources used in AAS
8. Write about Hollow cathode lamp
9. Write about the applications off AAS

UNIT-IV

10. Write about qualitative and quantitative applications of Polarography
11. State and explain about Ilkovic equation
12. Explain about Diffusion current and half wave potentials.
13. Explain about residual current and migration current.
14. Write about DME
15. Explain the principles of coulometer
16. Write about the applications of coulometer

UNIT-V

17. Write about electrochemical cell
18. Explain about electrode potentials.
20 .What is EMF? Write about cell potential
21. Explain about Glass electrode.
23. Explain about metal-metal ion electrode.

P. R. GOVERNMENT COLLEGE (A), KAKINADA
B. Sc. (Analytical Chemistry SEMESTER –V

Practical – VI

Instrumental methods of analysis

30 hrs.(2 h/w)

1. Determination of Fe (II) with Cr (VI) by using Potentiometric titration method.
2. Determination of Fe (II) with Mn (VII) by using Potentiometric titration method.
3. Determination of metals in given samples by AAS technique.
4. Preparation of standard calibration graphs of Pb, Cd, Zn and Fe by AAS
5. Determination of Fe (III) by Spectrophotometric method.

Suggested Readings:

1. P.W. Atkins: Physical Chemistry.
2. G.W. Castellan: Physical Chemistry.
3. C.N. Banwell: Fundamentals of Molecular Spectroscopy.
4. Brian Smith: Infra-red Spectral Interpretations: A Systematic Approach.
5. W.J. Moore: Physical chemistry.

	Pithapur Rajah's Government College (Autonomous) Kakinada	**Program &Semester III B.Sc. Mathematics, Chemistry, Analytical chemistry Semester-V (P-VII)**			
Course Code	**ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS**				
Teaching	**Hours Allocated: 60 (Theory)**	**L**	**T**	**P**	**C**
Pre-requisites:	Analysis of soaps, paints, oils, fats, industrial solvents, fertilizers, gases and complex materials.	60	10	30	4+1

Course Objectives:

1. Gains knowledge and awareness about some applied industrial Products
2. Gains some knowledge about Industrial standards and Control
3. Gains knowledge on practical Analytical chemistry and its applications in various fields

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1	Understand the basic concepts in analysis of soaps detergents, paints, fats and industrial solvents
CO2	Learning analysis of fertilizers, starch, sugars and gases
CO3	Exploring the analysis of complex materials

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development			Employability			Entrepreneurship	

UNIT-I **9hrs**

ANALYSIS OF SOAPS, DETERGENTS AND PAINTS

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 **9hrs**

ANALYSIS OF FATS & OILS AND INDUSTRIAL SOLVENTS

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 methoxyl and N-methyl groups.

UNIT-III **9hrs**

ANALYSIS OF FERTILIZERS STARCH, SUGAR, AND PAPER

Analysis of Fertilizers: Urea, NPK fertilizer, Super phosphateAnalysis of DDT, BHC, Endrin

Analysis of Starch, Sugars and Paper

UNIT-IV **9hrs**

ANALYSIS OF GASES

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

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

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

UNIT-V **9hrs**

ANALYSIS OF COMPLEX MATERIALS

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

Analysis of glasses - Determination of silica, Sulphur, barium, arsenic, antimony, total R2O3, calcium, magnesium, total alkalis, aluminum, chloride, fluoride

Text Book

S NO	AUTHOR	TITLE	PUBLISHER
1	Griffin	Technical methods of analysis	Mc G raw Hill BOOK Co
2	H.H. Willard and H. Deal	Advanced quantitative analysis	Van Nostrand Co
3	Welcher	Standard Methods of chemical analysis	Krieger publishing company

Reference Books

S NO	AUTHOR	TITLE	PUBLISHER
1	G. Zweig	Analytical methods for pesticides, plant growth regulators and foodadditives - Vols I to VII	Academic press NEW YORK
2	H.H. Willard and H. Deal	Advanced quantitative analysis	Van Nostrand Co
3	Welcher	Standard Methods of chemical analysis	Krieger publishing company

Weblink's:

1. https://youtu.be/iipY_DDuAeg
2. https://youtu.be/gfIizOBI5wY
3. https://youtu.be/XlTEF0ipje8

Course Outcomes

CO-1	Understand the basic concepts in analysis of soaps detergents, paints, fats and industrial solvents
CO-2	Learning analysis of fertilizers, starch, sugars and gases
CO-3	Exploring the analysis of complex materials

Program Outcomes

PO1 : Knowledge in Chemistry : Apply the basic knowledge of analysis of chemistry to the Environmental chemistry to the soaps detergents, paints, fats, industrial solvent, fertilizers, starch, sugars, gases and complex materials

PO2: Problem analysis: Identify and analysing the analysis parameters for finding the solutions in adulterated soaps detergents, paints, fats, industrial solvent, fertilizers, starch and sugars

PO3: Design/development of solutions: Design solutions for simple to complex problems in analytical chemistry through analysis of gases and complex materials.

PO4: Conduct investigations of complex problems: Use fundamental research-based knowledge and available research methods including design of experiments, analysis and interpretation of data.

PO5 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools for modeling and interpretation of simple to complex problems in analysis of soaps detergents, paints, fats, industrial solvent, fertilizers, starch, sugars, gases and complex materials.

PO6 : The Chemist & Society: Applying the contextual knowledge to assess societal, health, safety, legal and cultural issues.

PO7: Environment and sustainability: Understand the importance of chemical analysis for various solutions in societal and environmental context and demonstrate the knowledge and need for sustainable development.

PO8 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the science-based practice to harness ecosystem and biodiversity.

PO9 : Communication: Communicate effectively on complex Chemical activities with the Chemistry community and with society at large, such as, being able to comprehend and write effective reports, design documentation and make effective presentations

PO10: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES

PSO-1: To identify, analyse the adulterate problems in soaps detergents, paints, fats, industrial solvent, fertilizers, starch, sugars, gases and complex materials.

PSO-2: Applying knowledge of analysis of chemistry to analyze and obtain valid conclusions for measuring purity of the compunds.

PSO-3: Use of various Simulation tools for studying the purity and by-products of various commercial chemicals

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	0	2	3	1	1	1	1	1	3	2	1
CO2	3	3	0	2	2	1	1	1	1	1	3	1	1
CO3	0	0	3	2	0	1	1	1	1	1	0	1	1

Low =1 ; Moderate = 2 ; High = 3 ; No Correlation = 0

Weightage to content

Semester -V

Paper-VII

S. NO	Course Content	Long Answer	Short Answer	Total marks	As per Blooms Taxonomy
1	Analysis of soaps, detergentsand paints	1	1	15	Understanding, Application
2	Analysis of fats & oils andindustrial solvents	1	2	20	Remembering, Understanding
3	Analysis of fertilizers, starch, sugars and paper	2	2	30	Application
4	Analysis of gases	1	1	15	Remembering, Understanding
5	Analysis of complex materials	1	1	15	Application, Understanding
	TOTAL	**6**	**7**	**95**	

PITHAPUR RAJAH'S GOVERNMENT COLLEGE, KAKINADA

MODEL QUESTION PAPER

SEMESTER-V

Paper – VII(ANALYTICAL CHEMISTRY-7)

ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS

Duration: 2hrs Max. Marks: 50M

SECTION – I

Answer any THREE of the following questions and attempt one question from the each part from the section each question carries 10 marks

PART-A **3X 10 = 30M**

1. .How do you determine the total fatty matter and free alkali of soaps?
2. Explain about the analysis of Oils
3. Write about the analysis of starch, paper analysis

PART-B

4. Write about the ultimate analysis of C and H
5. Explain about the analysis of cement
6. Explain about the analysis of NPK fertilizers

SECTION – II

Answer any FOUR of the following questions. Each carries 5Marks **5X 4= 20M**

7. Explain about the analysis of $BaSO_4$ in paints
8. Write about the analysis of Iodine value in oils
9. Write about the analysis of Urea
10. Write about the analysis of water gas and producer gas
11. Write about the composition of glass
12. Explain about the analysis of acid value in oils
13. Explain about the analysis of paper

(A), KAKINADA

SEMESTER –VI

PAPER – VII: ANALYTICAL CHEMISTRY

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 Na2CO3.10H2O 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 complexometrictitration with EDTA
10. Determination of Calcium and Magnesium present in the Limestone or Dolomite Samples
11. Determination of Ammonia from ammonia

containing fertilizerSUGGESTED 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 Ito 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 andDistributors, New Delhi
9. G. Ingram- Methods of organic elemental micro analysis- Chapman and Hall

P. R. GOVERNMENT COLLEGE,

KAKINADA SEMESTER – VI Paper - VII

(ANALYTICAL CHEMISTRY-7)

ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS

Duration: 2hrs. 30Min. Max. Marks: 50

Question Bank: 10 M

Essay Questions: UNIT-I

1. How do you analyze lead chromate and zinc chromate present in paints?
2. How do you determine the total fatty matter and free alkali of soaps?

UNIT-II

3. Describe the analysis of benzene.
4. Explain about the analysis of Oils

UNIT-III

5. Explain about the analysis of NPK fertilizers
6. Write about the analysis of DDT and BHC
7. Write about the analysis of starch, paper analysis

UNIT-IV

8. Explain about the analysis of CO2 and saturated hydrocarbons
9. Write about the analysis of water gas and producer gas
10. Write about the ultimate analysis of C and H

UNIT-V

11. Write about the analysis of total silica and lime content in cement
12. Explain about the analysis of cement
13. Write about the analysis of silica and total alkalis in glasses.
14. Explain about the analysis of glass.

Short Questions:05 M

UNIT-I

1. Explain about the analysis of Sodium silicate in soaps
2. Explain about the analysis of $BaSO_4$ in paints

UNIT-II

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.

UNIT-III

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 sugar
12. Explain about the analysis of paper

UNIT-IV

13. Explain about octane number
14. Write about cetane number
15. Write about the analysis of water gas.
16. Write about the analysis of producer gas.

UNIT-V

17. Write about the analysis of sulphuric anhydride in cement
18. Explain about the analysis of ferric oxide content in cement
19. Explain about the determination of calcium in Glasses
20. Explain about the determination of magnesium in Glasses
21. Explain about the determination of Sulphur in Glasses
22. Write about the composition of cement
23. Write about the composition of glass

PROCEEDINGS OF THE PRINCIPAL,
PITHAPUR RAJA'S GOVERNMENT COLLEGE (A) KAKINADA- A.P

Present: Dr. B. V. Tirupanyam, M. Sc; Ph.D.

R.C.No.1/A.C./BOS/2023-24, Dated: 29.08.2023

SUB: PITHAPUR RAJA'S Government College (A), Kakinada-UG Board of Studies (BOS)- B.Sc- Analytical Chemistry- Nomination of Members-Orders issued.

REF: 1. UGC Guidelines for Autonomous Colleges-2018.

ORDERS:

The Principal, P.R. Government College (A), Kakinada is pleased to constitute UG Boards of Studies in ANALYTICAL CHEMISTRY for framing the syllabi in respective Subject for all Semesters duly following the norms of the UGC Autonomous guidelines.

S. No	Name of the Person	Designation
1	V. Sanjeeva Kumar	Chairman & Lecturer Incharge
2	Dr. K. Jhansi Lakshmi ASD Govt. Degree College for Women (Autonomous) Kakinada	University Nominee
3	Dr. D. Chenna Rao Lecturer in Chemistry, Govt. Degree College, Yeleswaram	Subject Expert -I
4	U. Sai Krishna Lecturer in Chemistry, Govt. College, (Autonomous) Rajamahendravaram	Subject Expert - II
5	Dr. B. Ramesh Babu Founder & M.D., BogaR laboratories, Peddapuram.	Representative from Industry
6	T. V. V. Satyanarayana	Member
7	P. Vijay Kumar	Member
8	V. Ram babu	Member
9	G. Pavani	Member
10	Dr. N. Bujji Babu	Member
11	Dr. Ch. Praveen	Member
12	V. Venkateswara Rao	Member
13	U.S.N. Prasad	Member
14	B. Bhavani	Member
15	G. Surya Priya	Student Alumni Member
16	B. Balaji III MCAC	Student Member
17	R. Aditya Naidu III MCAC	Student Member
18	R Renuka II MCAC	Student Member

The above members are requested to attend the BoS meeting on 31-08-2023 and share their valuable reviews, and suggestions on the following functionaries.

- 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 IQAC and Academic Council.
- Suggested methodologies for innovative teaching and evaluation techniques.
- Suggest the panel of Names to the academic council for appointment of Examiners.
- Coordinate research, teaching, extension and other activities in the Department of the college.

PRINCIPAL
29 August 23
P. R. Government College(A),
Kakinada

Signature of the member who attended the board of studies in Analytical chemistry on 31st Aug 2023
Mode of conduct of meeting – offline and online

S. No	Name of the Person	Signature of the member	Mobile number
1	V. Sanjeeva Kumar	V. S	9849852497
2	Dr. K. Jhansi Lakshmi	K. J. L	9441256469
3	Dr. D. Chenna Rao		9560740108
4	U. Sai Krishna	U. Saikrishna	9347334702
5	Dr. B. Ramesh Babu		
6	T. V. V. Satyanarayana	T. V. V.	9490876913
7	P. Vijay Kumar	Vijay	9652023082
8	V. Ram babu	Babu	9948485537
9	G. Pavani		9912526493
10	Dr. N. Bujji Babu	31/8	9441394792
11	Dr. Ch. Praveen	Praveen	9491855518
12	V. Venkateswara Rao	V. Venkateswara Rao	9885165588
13	U.S.N. Prasad	USN P 31/8/23	63008 82584
14	B. Bhavani	Bhavani 31/8/23	9492912929
15	G. Surya Priya		
16	B. Balaji		
17	R. Aditya Naidu	P. S.V. Adityanaidu	9133871329
18	R Renuka	R. Renuka	7730097699