P. R. GOVERNMENT COLLEGE (A) KAKINADA
(Affiliated to Adikavi Nannaya University)

DEPARTMENT OF CHEMISTRY

B. Sc Chemistry Syllabus under CBCS

BOARD OF STUDIES

2019-20

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

Recommended Composition of the Board of Studies of Chemistry

And it's Functions of an Autonomous College

April-2019-20

I Composition

1. **Head of the Department concerned (Chairman):**

   Sri T. Vara Prasad, M.Sc., M.Phil, M.Ed (Ph.D)

2. **The entire faculty of each specialization.**

   1. Sri D.Rama Rao, M.Sc., B. Ed., M.Phil.
   2. Sri V.Mallikarjuna Sarma,MSc, M.Phil,NET
   3. Dr.V.Narayana Rao M.Sc, NET, Ph.D
   4. Sri U.Sai Krishna M.Sc,NET

3. **ONE experts in the subject from outside the college to be nominated by the Academic Council**

   1.Dr. K . Jhansi Lakshmi, Lecturer in Chemistry, Ideal Degree College, Kakinada

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

   1. Dr. K. Deepti, Adikavi Nannaya University, Rajahmundry

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

   1. Ch. V. N. S. Vara Prasad, Managing partner, DAS Pharma Ltd, Kakinada

6. **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.**

   1. Dr.K.Raghavachari 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 in 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.

Signatures of the members who attended the

Board of studies in Chemistry on 01.04.2019 at 10.00am

1.	Sri T. Vara Prasad	Chairman & Lecturer in Charge
2.	Dr. K. Deepti,	University representative Adikavi Nannaya University Rajamahendravaram
3.	Ch. V. N. S. Vara Prasad,	Managing partner, DAS Pharma Ltd, Kakinada
4.	Dr. K. Jhansi Lakshmi	Subject expert Lecturer in Chemistry, Ideal Degree College, Kakinada
5.	. Dr.K.Raghavachari	Retired Head of the Chemistry Department
6.	Sri D. Rama Rao	Member
7.	Sri V. Mallikarjuna Sarma	Member
8.	Dr.V.Narayana Rao	Member
9.	Sri U.Sai Krishna	Member
10.	Dr.D.S.V.N.M.Rama Murthy	Member
11.	Sri K.Babu Rao	Member
12.	Smt.S.Swarna Latha	Member
13.	Miss. M.S.T.B.V.Ratnam	Member
14.	Miss.G.Rama Lakshmi.	Member
15.	Mr.B.V.Siva Kumar	Member
16.	Miss.S.G.Kalyani	Member
17.	G.Sandhya	Member
18.	P.K.M.S.Devi	Member

Signatures of the members who attended the

Board of studies in Chemistry on 01.04.2019 at 10.00am

1.	Dr. T. Vara Prasad	Chairman & Lecturer in Charge 1/4/19
2.	Dr. K. Deepti,	University representative Adikavi Nannaya University Rajamahendravaram 1/4/19
3.	Dr.Ch. V. N. S. Vara Prasad,	Managing partner, DAS Pharma Ltd, Kakinada
4.	Dr. K. Jhansi Lakshmi	Subject expert Lecturer in Chemistry, Ideal Degree College, Kakinada
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6.	Sri D. Rama Rao	Member
7.	Sri V. Mallikarjuna Sarma	Member
8.	Dr.V.Narayana Rao	Member
9.	Sri U.Sai Krishna	Member 01/4/19
10.	Dr.D.S.V.N.M.Rama Murthy	Member 1/4/19
11.	Sri K.Babu Rao	Member 01/4/2019
12.	Smt.S.Swarna Latha	Member 1/4/2019
13.	Miss. M.S.T.B.V.Ratnam	Member 01/04/19
14.	Miss.G.Rama Lakshmi.	Member 01/04/19
15.	Mr.B.V.Siva Kumar	Member 01/04/19.
16.	Miss.S.G.Kalyani	Member
17.	G.Sandhya	Member
18.	P.K.M.S.Devi	Member
19.	J.Aruna Kalyani (MPC EM)	Student Member
20.	Sankar Rao (MPC EM)	Student Member
21.	A.Sravani Devi (MBC)	Student Member

ACTION PLAN BOS MEETING -CHEMISTRY HELD ON 01 -04-2019.

1. Department activities for 2019-2020 academic year. Annexure I

Month	Activity proposed	Faculty member in charge
June-19	Departmental staff meeting to review results and class work allotment	T. Vara Prasad
	Preparation of curricular plans, time-tables etc.,	
	Remedial coaching classes for II & III year supplementary exams	
	Bridge classes for I year students	
July-19	Student awareness programmes on ragging& eve teasing - consequences , self-discipline, career guidance, higher education opportunities etc.,	T.Vara prasad
August-19	Conference on prospects in pharmaceutical industries	T. Vara Prasad
	Study tour / Field trips	
Sept-19	Ozone day	
Oct-19	MOLE Day	D.Ramarao
	Faculty development programme	V.Mallikarjuna sarma
Nov-19	11th National Education Day – Out reach Programme to nearby school	
Dec-19	World AIDS Day	
	Chemistry day & Chem fest	V.Mallikarjuna sarma
Jan-20	10 days coaching for PG entrance examinations in chemistry Study tour / Field trips	V.Mallikarjuna sarma
Feb-20	NATIONAL SCIENCE DAY	V.Mallikarjuna sarma
March-20	Consumer awareness day	T. Vara Prasad

2. Organizing National/ State level seminars/Workshops/ Conferences/ Training programmes etc., with topics and other details.
(Mandatory for each Department)

i) Staff development programme

ii) Training in the use of HPLC
iii) Awareness on OZONE protection
iv) National Chemistry day
v) Chem. fest
vi) National Science day 2019
vii) Guest lectures
viii) National seminar in chemistry
ix) Training in Soil analysis
x) Training in water analysis

3. **Change of modules in the syllabus content.**
   Syllabus changed for first and second years as per university regulations. CBCS introduced for final year w.e.f. 2018-19.

4. **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 to: Rs, 50,000

   1. Visakha Steel Plant, Visakhapatnam
   2. Hetero Laboratories, Nakkapally
   3. Dr. Reddy's Laboratories, Yanam.
   4. National Institute of Hydrololgy, Kakinada.
   5. SAR Chandra Environ Solutions, Kakinada.
   6. ONGC mini refinery, Tatipaka.
   7. Soil analysis laboratory, Samalkot.
   8. IICT,HYD
   9. Venky parenterals, Yanam

II.

1. Sophisticated version UV-Visible spectrophotometer- 5.0 lakhs
2. Other equipment 1.0 lakhs
3. Petrochemicals equipment 1.0 lakhs

5. **Plan for organizing subject oriented community outreach programmes & allocation of necessary funds. (Mandatory for each Department)**
   i) Adoption of village Rs. 20,000
   ii) Medical Awareness programmes Rs. 10,000
6. **Instituting of new medals/incentives/prizes etc., from alumni, philanthropists, parents, faculty etc., - Strategies to be recommended**

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7. **Introduction of new programmes –PG/UG/Diploma and certificate courses.**

New courses to be proposed.

S.No.	New course proposed	Justification	Employability
1	Under graduate course in Industrial chemistry	There is dearth of skilled persons to operate various instruments like uv visible spectrophotometer, Atomic absorption spectrophotometer, PH meter, flame photometer, rotavapour instrument, HPLC.GLC, distillation, etc which play as key role in any industry related to chemistry.	Technical assistants, Quality control managers, Plant supervisors etc.

8. **Any other programme that enhances the learning capacity of students and their employable & knowledge skills.**
   Training in the use of instruments like AAS, UV-Vis, HPLC, flame photometer, uranium analyzer, soil and water analysis projects, air quality projects.
9. **Change in internal assessment exams for conducting II mid Semester by way of Project work/Assignment.**
   Not possible as the number of students is more. However it is proposed to give 33.3% weitage for competitive exam questions pertaining to the syllabus prescribed.
10. **proposed panel of examiners/paper setters & other experts/nominees for BOS deliberations.**
    Chemistry:
    1. Sri N. Lakshmana Rao, SKBR College, Amalapuram.
    2. Dr. D. Madhava Sarma, GDC,Tadepalligudem
    3. Dr. V. Sambasiva Rao, Govt.Arts College, Rajahmundry.
    4. Dr. K. A.R.S.S.Prasad, VS Krishna College, Visakhapatnam.
    5. Sri S.V. Ramana , Arts College, Rajahmundry
    6. Sri Machi Raju, Arts College, RajahmundrY
    7. Smt. C. Jyoti, St.Therisa college,Eluru.
    8. P. Krishna kumar,S.K.B.R.College,Amalapuram.
    9. Dr. G. Venkatarao,GDC,Vijayavada
    10. Shri B.Venkatarao, GDC,Tadepalligudem
    11. Dr.Ramchadarao,Y.N.College,Narasapuram

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

DEPARTMENT OF CHEMISTRY,

Minutes of board of studies(BOS) meeting 2019-20 on 01-04-2019 at 10.30am

Resolutions:

The board of studies meeting chemistry department on 01-04-19 at 10.30 am in the guest room of the college under the chairmanship of Dr. T.Vara Prasad ,in charge of the department The principal Dr. Chappidi Krishna, Dr.K.Deepthi, University Nominee., Dr.K.Jhansi Lakshimi, Head in Chemistry, Ideal College, Kakinada., all members of the faculty of chemistry and student representatives attanded the meeting. agenda items are discussed and resolutions are made.

1. It is resolved to cotinue choice based credit system in the chemistry combination programmes as per the directions of the CCE, Hydreabad to the first year and second year and second year and final year students w.e.f. 2017-2018.

2. Resolved to follow 60%-40% extenrnal and internal w.e.f. 2017-2018 admitted batch and it continued in second and third year.

3. It is resolved to allot 50 marks project work for final year students in chemistry preferably in cluster paper C_3 practicals.w.e.f 2019-20 accordance with APSCHE.

4. in the first year admitted batch w.e.f 2019-20 multiple choice questions and question bank prepared in the first year students only.

i) Mid examination –I follows online

ii)Mid examination –II follows offline

5. It is resolved to conduct departmental activities such as OZONE DAY, CHEM. FEST , CHEMISTRY DAY and SCIENCE DAY.

6. It Is Resolved to offer Subject Electives and clusters in the V and Vi Semester Respectively as per the guidelines of AKNU we adopted the folling syllabus

Elective paper -1

Cluster VIII C papers - 3 (C_1, C_2, C_3)

7. It is resolved to implement the recommended padagogy for the first semester 2018-2019

8. Resolved to conduct practical examinations semester wise.

9. It is resolved to organize guest lectures by eminent professors.

10. Resolved to implement pass minimum for internal assessment for CBSE pattern students as the pattern is learner oriented.

11. It is resolved syllabus change for I , II, III elective, clusters as per the AKNU lines.

12. CBCS introduced for final years w.e.f. 2016-2017.

13. Introduced cluster system for final year w.e.f 2017-2018.

14. cluster theory paper C_3 introduced w.e.f 2019-20 in the place of project 150 marks.

15. project 50 marks in the place of cluster theory paper practicals w.e.f 2019-20

16. followed ratio 60:40 and it continued in third year.

17.it is resolved that B.Voc Pharmaceutical Chemistry course is restructured in B.Sc professional (Pharmaceutical chemistry) w.e.f 201-20. The proposal is put followed to academic council and general body meeting.

18. It is advised to allocate only 50 marks for project in VI semester(cluster VIII-C_3)

19.It is resolved to maintain status quo for same question paper pattern in I, II, III years.

The Following Paper Setter Are Recommended.

1). Dr. V. Sambasiva Rao, Govt,Arts College, Rajahmundry.

2). Dr.K.A.R.S.S. Prasad, VS Krishna College,Visakhapatnam.

3). Sri S.V. Ramana, Arts College, Rajahmundry.

4). Sri Machi Raju, Arts College, Rajahmundry.

5). Sri U. Satyanarayana , GDC, Tuni.

6). Sri R. Brahmaji, GDC, Ramachandrapuram.

7). Sri N.V. Sudhakar, GDC, Tuni.

New Courses

20. It is resolved to explore the possibility of introducing a new course in bsc analytical chemistry ,maths,chemistry as per the Govt./CCE order w.e.f 2018-2019.

21. Resolved to submit proposals to conduct a faculty development programme in instrumentation techiniques/ advanced topics with the assistance of the industry representatives and university representatives.

22. Resolved to assist the orphan children of below two years age being taken by department of women and child welfare as an extension activity with the funds contributed by the faculty members of the department.

23.resolved to change the syllabus components in semester **I** to Semester **II** and vice versa. Sly semester **III** to **IV** and vice versa on par with the affiliating university.

24. it is proposed to give 33.3% weitage competitive exam questions pertaining to the syllabus prescribed

25. Resolved to reduce the intake of Bsc MPC TM students from 60 to 30 w.e.f from 2019-20.

26. Resolved to increase the intake of Bsc MPC EM students from 30 to 60 w.e.f. from 2019-20.

27. Resolved to take girls students also for admissions into Bsc MCPc w.e.f. from 2019-20.

Special Features of Chemistry Department

1. In the cluster system 85 students opted chemistry projects and they submitted projects to our college under the guideance of eminemt lecturers.

2.NAAC team visited our college chemistry department on 08-09-2017 and chairman commented **"chemistry department is very good"** in always.

3. CCB academic team visited our chemistry department on 21-03-2018 and team head was commented as **“ chemistry department is excellent”** always.

Modern Lecture Methods & New Techniquis

4.Power Point Presentation / LCD Teaching.

5.Virtual Class Teaching Methods.

6.Feedback on Teching Performance.

P.R.GOVERNMENT COLLEGE(A), KAKINADA

B.Sc. Chemistry Syllabus under CBCS

Structure of Chemistry Syllabus Under CBCS

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS
I	I	I	Inorganic and Organic Chemistry	100	03
			Practical – I	50	02
	II	II	Physical and General Chemistry	100	03
			Practical – II	50	02
II	III	III	Inorganic and organic Chemistry	100	03
			Practical – III	50	02
	IV	IV	Spectroscopy and Physical Chemistry	100	03
			Practical – IV	50	02
III	V	V	Inorganic ,Organic and Physical Chemistry	100	03
			Practical – V	50	02
		VI	Inorganic ,Organic and Physical Chemistry	100	03
			Practical – VI	50	02
	* Any one Paper from VII A, B and C ** Any one cluster from VIII, A, B and C VI	VII (A)*	Elective	100	03
			Practical - VII A	50	02
		VII (B)*	Elective	100	03
			Practical - VII B	50	02
		VII (C)*	Elective	100	03
			Practical - VII C	50	02
		VIII (A)**	**Cluster Electives - I :**		
			VIII-A-1	100	03
			VIII-A-2	100	03
			VIII-A-3	100	03
			Practica l	50	02
			Practica l	50	02
			Project	50	02
		VIII (B)**	**Cluster Electives - II ::**		
			VIII-B-1	100	03
			VIII- B-2	100	03
			VIII-B-3	100	03
			Practica l	50	02
			Practica l	50	02
			Project	50	02
		VIII (C)**	**Cluster Electives - III ::**		
			VIII-C-1	100	03
			VIII-C-2	100	03
			VIII-C-3	100	03
			Practica l	50	02
			Practica l	50	02
			Project	50	02

OBJECTIVES

- **Objectives**
  The students can obtain the knowledge in the following topics and come to know how chemistry is essential in daily life.

1. Preparation, properties and applications of some special compounds of s and p block elements.
2. Structural theory of Organic compounds.
3. Preparation, properties and applications of alkenes, alkynes and cycloalkanes.
4. Benzene structure and its reactivity.
5. Identification of some cations and anions in the unknown salt.

- **By the end of II semester, each and every I degree chemistry student can obtain the knowledge in the following topics and come to know how chemistry is essential in daily life.**

1. Features involved in gaseous state, liquid state and solid state and their applications.
2. Importance of colloids and adsorption.
3. Chemical bonding between molecules through M.O. theory.
4. Identification of some cations and anions in the unknown mixture.
5. Basic knowledge and Importance of of Stereochemistry.

- **By the end of III semester, each and every II degree chemistry student can attain the knowledge in the following topicss and come to know their role in serving the society through chemistry.**

1. Properties of d and f block elements.
2. Boding nature of the metals.
3. Preparation, properties and applications of halogen compounds, hydroxyl compounds, carbonyl Compounds and carboxylic acids.
4. Importance and synthetic applications of active methylene compounds.
5. Estimation of Fe (II) and Cu (II) in the unknown material through practical.
6. Reactions of some functional groups like phenols, carboxylic acids, aldehydes, ketones, amines and Amides.

- **By the end of IV semester, each and every II degree chemistry student can attain the knowledge in the following topicss and come to know their role in serving the society through chemistry.**

1. Different types of Electronic transitions present in Organic molecules..
2. Identification of Functional groups using IR spectrum.
3. Analysis of Cr and Mn using spectrophotometer.
4. Structural identifications of organic compounds using H^1-NMR
5. Different aspects of electrochemistry.
6. Identification of functional group present in the given organic compound by IR spectral analysis.
7. Importance of conductometric techniques by doing strength of acids and bases.

- **By the end of V semester, each and every III degree chemistry student can obtain the knowledge in the following topics and come to know how to serve the society by becoming a chemist.**

1. Involved theories and properties of coordination compounds.
2. Preparation and properties of nitrogen compounds.
3. Importance, preparations, properties and medicinal uses of heterocyclic compounds.
4. Structural elucidation of glucose and fructose.
5. Importance of Amino acids and Proteins.
5. Determination of Rate of the reactions through chemical kinetics.
6. Some photochemical reactions photophysical processes.
7. Importance of thermodynamical aspects.
8. Identification of functional group present in the given organic compound by following organic qualitative analysis.
9. Determination of surface tension and viscosity of some liquids.

- **By the end of VI semester, each and every III degree chemistry student can get the knowledge in the following topics depending on their choice/interest and come to know how to serve the society by becoming a chemist.**

1. Various types of instrumental techniques like IR and NMR spectroscopies.
2. Different aspects of Environmental Chemistry.
3. Importance of green chemistry.
4. Analyses of drugs, dairy products
6. Importance of petrochemicals.
7. Preparation of some organic compounds.
8. Synthesis of organic compounds using green synthesis.

9. Hands on experience in operating colorimeters, pH meters and potentiometers.

10. Submission of a project work.

OUT COMES

After completion of B.Sc. course the students will be able to:

1. Acquire comprehensive knowledge in physical inorganic and organic chemistry.
2. Acquire experimental skills in chemical analysis.
3. Apply their knowledge and understanding in new situations.
4. Have industrial exposure by visiting near by industry plants.
5. Achieve good ranks in PG entrance examinations.
6. Acquire employable skills and become industry ready persons.
7. Get motivation for research by carrying out projects.
8. Gain leader ship quality by participation in extension programmes and group projects etc.

P. R. GOVERNMENT COLLEGE, KAKINADA
SYLLABUS FOR SEMESTER – II (CHEMISTRY)
Paper II (Physical & General Chemistry) 60 hrs. (4h/w)

OBJECTIVES: .1. COMPARES THE VB THEORY AND MOLECULAR ORBITAL THEORY
2. UNDERSTANDS THE PRINCIPLES INVOLVED IN TITRIMETRIC AND GRAVIMETRIC ANALYSIS
3. ABLE TO APPRECIATE THE APPLICATIONS OF COLLOIDS AND ADSORPTION

PHYSICAL CHEMISTRY 30 hrs (2h / w)

UNIT-I

Solid state l0h

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

UNIT-II

1. Gaseous state 6h

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

2. Liquid state 4h

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

UNIT-III

Solutions l0h

Liquid-liquid - ideal solutions, Raoult's law. Ideally dilute solutions, Henry's law. Non ideal solutions. Vapour pressure - composition and vapour pressure- temperature curves. Azeotropes-HCl-H_2O, ethanol-water systems and fractional distillation. Partially miscible liquids-phenol-water, trimethylamine-water, nicotine-water systems. Effect of impurity on consulate temperature. Immiscible liquids and steam distillation. Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

GENERAL CHEMISTRY 30 hrs (2h / w)

UNIT-IV

I. Surface chemistry 8h

Definition of colloids. Solids in liquids (sols), preparation, purification, properties - kinetic, optical, electrical. Stability of colloids, Hardy-Schulze law, protective colloid. Liquids in liquids (emulsions) preparation, properties, uses. Liquids in solids (gels) preparation, uses. Adsorption: Physical adsorption, chemisorption. Freundlisch, Langmuir adsorption isotherms. Applications of adsorption.

2. Chemical Bonding 7h

Valence bond theory, hybridization, VB theory as applied toClF_3, $Ni(CO)_4$, Molecular orbital theory - LCAO method, construction of M.O. diagrams for homonuclear and hetero-nuclear diatomic molecules
(N_2, O_2, CO and NO).

UNIT-V

Stereochemistry of carbon compounds **15 h**

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae. Optical isomerism: Optical activity- wave nature of light, plane polarised light, optical rotation and specific rotation. Chiral molecules- definition and criteria (Symmetry elements)- Definition of enantiomers and diastereomers – Explanation of optical isomerism with examples Glyceraldehyde, Lactic acid, Alanine, Tartaric acid, 2,3-dibromopentane. D, L and R, S configuration methods and E,Z- configuration with examples.

List of Reference Books

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

P. R. GOVERNMENT COLLEGE, KAKINADA
SYLLABUS FOR SEMESTER – II (CHEMISTRY)
Paper II (Physical & General Chemistry)
Weightage to content

S. No.	Course Content	Essay Questions (10M)	Short Answer Questions (5M)	Total No. Of Questions from each Unit	Total No. of Marks allotted to each Unit
	Physical Chemistry				
1	Unit - I	1	1	2	15
2	Unit - II	1	2	3	20
3	Unit - III	2	1	3	25
	General Chemistry				
4	Unit - IV	2	3	5	35
5	Unit - V	2	1	3	25
	TOTAL	**8**	**8**	**16**	**120**

LABORATORY COURSE -II **30** hrs (2 h / w)

Practical-II Analysis of Mixture Salt (At the end of Semester-II)

Qualitative inorganic analysis

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

Anions: Carbonate, sulphate, chloride, bromide, acetate, nitrate,

Cations: Lead, copper, iron, aluminum, zinc, manganese, calcium, strontium, barium, potassium and ammonium.

P. R. GOVERNMENT COLLEGE, KAKINADA
MODEL PAPER FOR SEMESTER – II (CHEMISTRY)
Paper II (Physical & General Chemistry)

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

SECTION – A (PHYSICAL CHEMISTRY)

Answer any **TWO** questions. Each question carries **10** marks. 2 X 10 = 20M

1. Explain the determination of crystal structure by Bragg's method.
2. Why do real gases deviate from ideal gas behavior? Derive Vander Waal's equation of state.
3. State and explain Nernst distribution Law. Write its limitations. Explain the applications of
   Nernst distribution Law.
4. Define Critical Solution Temperature. Explain the critical solution temperature of Phenol – water system and Nicotine – water system.

SECTION – B (GENERAL CHEMISTRY)

Answer any **TWO** questions. Each question carries **10** marks. 2 X 10 = 20M

5. Explain the kinetic, optical and electrical properties of colloids.
6. Write the salient features of Molecular Orbital Theory. Draw the Molecular Orbital Energy diagram of O_2 molecule and explain its bond order and magnetic behavior.
7. Explain Cahn Ingold and Prelog rules for assigning R, S configuration to optically active molecules with examples.
8. Define optical isomerism. Explain the optical isomerism in Lactic acid, alanine and tartaric acid.

SECTION – C

Answer any **FOUR** questions. Each question carries **5** marks. 4X 5 = 20M

9. Explain the stoichiometric defects in crystals.
10. How are liquid crystals classified? Explain each.
11. Write the differences between liquid crystals and liquids/solids.
12. Write a brief note on steam distillation.
13. Write the differences between physical adsorption and chemical adsorption.
14. Explain the structure of $Ni(CO)_4$.
15. Write the preparation and uses of emulsions.
16. Define enantiomers and diastereomers. Give examples.

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P. R. GOVERNMENT COLLEGE, KAKINADA
Paper II (Physical & General Chemistry)
Question bank

Esssay questions:

1. Explain the kinetic, optical and electrical properties of colloids.
2. Langmuir adsorption isotherms
3. Write the salient features of Molecular Orbital Theory. Draw the Molecular Orbital Energy diagram of N_2, O_2, CO and NO molecules and explain its bond order and magnetic behavior
4. Explain Cahn Ingold and Prelog rules for assigning R, S configuration to optically active molecules with examples
5. Define optical isomerism. Explain the optical isomerism in Lactic acid, alanine and tartaric acid, Glyceraldehyde, 2, 3-dibromopentane.

Short answers

1. Preparation and purification of colloids
2. Hardy-Schulze law
3. Write the preparation and uses of Emulsions and Gels?
4. Differences between chemisorptions and Physical adsorption?
5. Write the Applications of adsorption
6. Explain the structures of ClF_3 and $Ni(CO)_4$?
7. Molecular representations Wedge, Fischer, Newman and Saw-Horse formulas
8. Define enantiomers and diastereomers. Give examples

Esssay questions:

1. Explain the determination of crystal structure by Bragg's method?
2. Explain the stoichiometric and non-stoichiometric defects in crystals?
3. Why do real gases deviate from ideal gas behavior? Derive Vander Waal's equation of state?
4. Write relationship between critical constants and vander Waal'sconstants?
5. State and explain Nernst distribution Law. Write its limitations. Explain the applications of Nernst distribution Law
6. Define Critical Solution Temperature. Explain the critical solution temperature of Phenol – water system and Nicotine – water system

Short answers

1. Law of constancy of interfacial angles?
2. Explain Joule Thomson effect
3. How are liquid crystals classified? Explain each
4. Write the differences between liquid crystals and liquids/solids?
5. Write a brief note on Henry Law?
6. Explain Raoult's law?