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

DEPARTMENT OF CHEMISTRY

B. Sc Chemistry Syllabus under CBCS

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Board of Studies
2018-19

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

Recommended Composition of the Board of Studies of Chemistry

And it' s Functions of an Autonomous College

April-2018-19

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

   1. Dr. V .Sambasivarao, Lecturer in Chemistry, Arts College, Rajahmundry
   2. 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. Prof. 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. Sri. Nemani Ramam, M.Sc., M.Phil

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.

<u>Signatures of the members who attended the</u>

<u>Board of studies in Analytical Chemistry on 07.04.2018 at 2.00pm</u>

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. V. Sambasivarao, — Subject expert
   Lecturer in Chemistry,
   Govt. Arts College,
   Rajamahendravaram

5. Dr. K. Jhansi Lakshmi — Subject expert
   Lecturer in Chemistry,

Ideal Degree College, Kakinada

6. Sri. N. Ramam — Alumnus, Principal, Retd.
7. Sri D. Rama Rao — Member
8. Sri V. Mallikarjuna Sarma — Member

ACTION PLAN BOS MEETING -CHEMISTRY HELD ON 07 -04-2018.

1. Department activities for 2018-2019 academic year. Annexure I

Month	Activity proposed	Faculty member in charge
June-18	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-18	Student awareness programmes on ragging& eve teasing - consequences , self-discipline, career guidance, higher education opportunities etc.,	T.Vara prasad
August-18	Conference on prospects in pharmaceutical industries	T. Vara Prasad

	Study tour / Field trips	
Sept-18	Ozone day	
Oct-18	MOLE Day	D.Ramarao
	Faculty development programme	V.Mallikarjuna sarma
Nov-18	11th National Education Day – Out reach Programme to nearby school	
Dec-18	World AIDS Day	
	Chemistry day & Chem fest	V.Mallikarjuna sarma
Jan-19	10 days coaching for PG entrance examinations in chemistry Study tour / Field trips	V.Mallikarjuna sarma
Feb-19	NATIONAL SCIENCE DAY	V.Mallikarjuna sarma
March-19	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
xi)

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. **Institution 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	Technical assistants, Quality

		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.	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 propose to give 33.3% weitage for competitive exam questions pertaining to the syllabus prescribed.

10. **Suggest 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

Department of Chemistry BOS Meeting Dt.07 -04-2018

Resolutions:

Meeting of Board of studies in chemistry is convened on 07-04-18 in the guest room of the College. The Principal Dr. Chappidi Krishna, Dr.K.Deepthi , University Nominee , Ch. V. N. S. Vara Prasad, Managing partner, DAS Pharma Ltd, Kakinada, Dr.V.Sambasiva Rao , Subject Expert, Govt. Degree College, Tuni, Dr. . Jhansi Lakshmi, Lecturer in Chemistry, Ideal College, Kakinada. , all members of the faculty of Chemistry and student representatives attended the meeting. 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, Hyderabad to the first year and second year and final year students w.e.f. 2018-19
2. Enhance the internal assessment component from 30% to 40% in theory to first year (admitted batch) extended to second year also.
3. It is resolved to allot project works for final year students who opt for project work in chemistry preferably industry based.
4. It is resolved to conduct departmental activities such as Ozone day, Chem fest, Chemistry day and Science day etc.
5. It is resolved to offer subject electives and skill based electives in the V and VI semesters respectively.
6. It is resolved to implement the recommended Pedagogy for the first semester 2018-19.
7. Resolved to conduct practical examinations semester wise.

   The following paper setters are recommended.

   i. Dr. V.Sambasiva Rao, Govt.Arts College, Rajahmundry.
   ii. K.A.R.S.S.Prasad, VS Krishna College, Visakhapatnam.
   iii. Sri S.V.Ramana , Arts College, Rajahmundry
   iv. Sri Machi Raju, Arts College, Rajahmundry.
   v. U. Satyanarayana, GDC, Tuni
   vi. R. Brahmaji, GDC, Ramachandrapuram
   vii. N. V. Sudhakar, GDC, Tuni
8. It is resolved to organize Guest lectures by eminent professors.
9. Resolved to implement pass minimum for internal assessment for CBSE pattern students as the pattern is learner oriented.
10. NEW COURSES:

    It is resolved to explore the possibility of introducing a new course in B.Sc Pharmaceuticals/Industrial Chemistry as Restructed course.

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

12. Resolve 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.
13. 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.
14. It is proposed to give 33.3% weitage for competitive exam questions pertaining to the syllabus prescribed.

New Courses

15. 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.
16. 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.
17. 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.
18. .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.
19. it is proposed to give 33.3% weitage competitive exam questions pertaining to the syllabus prescribed

Special Features of Chemistry Department

20. In the cluster system 74 students opted chemistry projrcts andthey were submitted projects to our college under the guideance of eminemt lecturers.
21. NAAC team visited our college chemistry department on 08-09-2017 and chairman was commented **" chemistry department is very good"** in always.
22. CCB academic team visited our chemistry department on 21-03-2018 and team head was commented as **" chemistry department is excellent"** in always.

Modern Lecture Methods & New Techniques

23. Power Point Presentation / LCD Teaching.
24. Virtual Class Teaching Methods.
25. Feedback on Teaching Performance.

Section – B (Physical chemistry) 2X10=20M

5. What are the colligative properties ? and determine the elevation of boiling point by Cottrel' s method.

6. State the main postulates of Debye-Huckel theory of strong electrolytes. Explain ' relaxation effect' and ' electrophoretic effect' from it. Write Debye-Huckel-Onsager equation.

7. i)Explain about Hydrogen electrode and Calomel electrode.

(ii)Write the principles and uses of Potentiometric titrations

8. Describe Pb-Ag system, with the help of phase diagram.

SECTION-C 4X5=20M

Answer any **four** questions. Each question carries 5 marks.

9. Explain the following (i)Transmittance and (ii)Absorbance

10. Explain (i)chromophore and (ii)Auxochrome

11. Explain absorption bands of various functional groups.

12. What is Chemical Shift? How it is calculated?

13. Define Van' t Hoff factor. Explain Van' t Hoff theory of dilute solutions.

14. Define specific conductance and equivalent conductance. And Explain variation of equivalent conductance with dilution.

15. Explain about Reversible and irreversible cells.

16. What is congruent and incongruent melting point-Give one example each?

SEMESTER-V

Paper - V (INORGANIC, PHYSICAL & ORGANIC CHEMISTRY)

45 hrs (3 h / w)

OBJECTIVES:

1. Gains knowledge on crystal field splitting in complexes.

2. Knowledge of spectral data of complexes.

3. Synthesis of Heterocyclic compounds.

4. Applications of Thermodynamics.

INORGANIC CHEMISTRY

UNIT – I

Coordination Chemistry: 8h

IUPAC nomenclature - bonding theories - Review of Werner's theory and Sedgwick' s concept of coordination - Valence bond theory - geometries of coordination numbers 4-tetrahedral and square planar and 6-octahedral and its limitations, crystal filed theory - splitting of d-orbitals in octahedral, tetrahedral and square-planar complexes - low spin and high spin complexes - factors affecting crystal-field splitting energy, merits and demerits of crystal-field theory. Isomerism in coordination compounds - structural isomerism and stereo isomerism, stereochemistry of complexes with 4 and 6 coordination numbers.

UNIT-II

1. **Spectral and magnetic properties of metal complexes: 4h**

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

ORGANIC CHEMISTRY

UNIT- III

Nitro hydrocarbons: 3h

Nomenclature and classification-nitro hydrocarbons, structure -Tautomerism of nitro alkanes leading to aci and keto form, Preparation of Nitro alkanes, reactivity -halogenations, reaction with HONO (Nitrous acid), Nef reaction and Mannich reaction leading to Micheal addition and reduction.

UNIT – IV

Nitrogen compounds: 10h

Amines (Aliphatic and Aromatic): Nomenclature, Classification into 1° , 2° , 3° Amines and Quarternary ammonium compounds. Preparative methods – 1. Ammonolysis of alkyl halides 2. Gabriel synthesis 3. Hoffman's bromamide reaction (mechanism). Reduction of Amides and Schmidt reaction. Physical properties and basic character - Comparative basic strength of Ammonia, methyl amine, dimethyl amine, trimethyl amine and aniline - comparative basic strength of aniline, N-methylaniline and N,N-dimethyl aniline (in aqueous and non-aqueous medium), steric effects and substituent effects. Chemical properties: a) Alkylation b) Acylation c) Carbylamine reaction d) Hinsberg separation e) Reaction with Nitrous acid of 1° , 2° , 3°

(Aliphatic and aromatic amines). Electrophillic substitution of Aromatic amines – Bromination and Nitration. Oxidation of aryl and Tertiary amines, Diazotization.

Heterocyclic Compounds: 8h

Introduction and definition: Simple five membered ring compounds with one hetero atom Ex. Furan. Thiophene and pyrrole - Aromatic character – Preparation from 1,4,- di carbonyl compounds, Paul-Knorr synthesis. Properties: Acidic character of pyrrole - electrophillic substitution at 2 or 5 position, Halogenation, Nitration and Sulphonation under mild conditions - Diels Alder reaction in furan. Pyridine – Structure - Basicity - Aromaticity - Comparison with pyrrole - one method of preparation and properties - Reactivity towards Nucleophilic substitution reaction.

PHYSICAL CHEMISTRY

UNIT- V

Thermodynamics: 12h

The first law of thermodynamics-statement, definition of internal energy and enthalpy. Heat capacities and their relationship. Joule-Thomson effect- coefficient. Calculation of w, for the expansion of perfect gas under isothermal and adiabatic conditions for reversible processes. State function. Temperature dependence of enthalpy of formation-Kirchoff s equation. Second law of thermodynamics. Different Statements of the law. Carnot cycle and its efficiency. Carnot theorem. Concept of entropy, entropy as a state function, entropy changes in reversible and irreversible processes. Entropy changes in spontaneous and equilibrium processes.

List of Reference Books

1. Concise coordination chemistry by Gopalan and Ramalingam

2. Coordination Chemistry by Basalo and Johnson

3. Organic Chemistry by Mare loudan, Purdue Univ

4. Advanced Physical Chemistry by

5. Text book of physical chemistry by S Glasstone

6. Concise Inorganic Chemistry by J.D.Lee

7. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan

8. A Text Book of Organic Chemistry by Bahl and Arun bahl

9. A Text Book of Organic chemistry by I L Finar Vol I

10. Advanced physical chemistry by Gurudeep Raj

Weightage to Content

Fifth semester

S.No	Course Content	Long Answer	Short Answer(SA)	Very short Answer(VSA)	Total. No. of questions	Total No. of marks allotted to each chapter
	Inorganic Chemistry					
1	Coordination Chemistry	3	3	1	6	44
2	Spectral and magnetic Properties		1	1	2	6
	Organic Chemistry					
1	Nitro hydro Carbons	1			1	12
2	Nitrogen Compounds	1	1	1	3	16
3	Heterocyclic compounds	1	1		2	14
	Physical Chemistry					
1	Thermodyanamics	3	3	2	8	44
	Total	9	9	5	23	136

P.R.COLLEGE (A), KAKINADA

III YEAR BSC-(Examination at the end of V semester) model paper

(Inorganic, Organic & Physical chemistry)

Paper-V

Time: 3Hrs **Max.Marks:70**

Answer any FOUR questions choosing at least one question from each section

SECTION-I **4x10=40M**

1. Write the salient features of Crystal field theory. Discuss the splitting of d-

Orbitals in case of tetrahedral complexes.

2. Explain the structures and magnetic behavior of $[Fe(CN)_6]^{4-}$ and $[Fe(CN)_6]^{3-}$ on the basis of Valence bond theory.

3. What is stereo isomerism? Discuss the stereo isomerism in complex Compounds of coordination numbers 4 and 6.

SECTION-II

4. Write note on

a) Nef reaction b) Michael reaction c) Mannich reaction

5. What are Amines? How the primary amines are prepared. Give the separation of amines by Hinsberg Method.

6. Give any two methods of synthesis of pyrrole. Explain why electrophilic substitution in Furan takes place at 2-position rather than 3-position.

SECTION-III

7. State and explain 1st law of thermodynamics

8. Derive Kirchhoff' s equation and mention its units.

9. Show that pv^r = Constant

SECTION-IV

Answer any Five questions 4x5=20M

10. Explain the factors affecting crystal field splitting energy.

11. Explain EAN rule with two examples.

12 What are low spin and high spin complexes- Give examples.

13 How is furan prepared? Give its Diel' s – Alder reaction.

14. Write about alkylation and acylation reactions of aniline

15. Prove that C_p-C_v=R

16. Write about Entropy

17. State and explain Joule- Thomson Effect

18. Discuss Chichibabin reaction.

SECTION-V

Answer ALL questions 5x2=10M

19. Write the IUPAC Names of the complexes: i) K_4 [Fe (CN) $_6$] ii) [Co (NH_3)$_6$] Cl_3

20. Electronic absorption spectrum of [Ti (H_2O) $_6$]$^{3+}$

21. Explain the basic character of Amines.

22. State second law of thermodynamics.

23. Define Enthalpy.

LABORATORY COURSE – V

Practical Paper – V Organic Chemistry

(at the end of semester V)

30 hrs (2 h / W)

Organic Qualitative Analysis: 50M

Analysis of an organic compound through systematic qualitative procedure for functional group identification including the determination of melting point and boiling point with suitable derivatives. Alcohols, Phenols, Aldehydes, Ketones, Carboxylic acids, Aromatic Primary Amines, Amides and Simple sugars.

SEMESTER-V

Paper - VI (INORGANIC, ORGANIC & PHYSICAL CHEMISTRY)

45 hrs (3 h / w)

OBJECTIVES:

1. Gains knowledge Labile and Inert complexes

2. Knowledge of Biological significance of inorganic elements.

3. Structure of Carbohydrates.

4. Synthesis of Amino acids.

INORGANIC CHEMISTRY

UNIT-I

1. **Reactivity of metal complexes:** **4h**

Labile and inert complexes, ligand substitution reactions - SN1 and SN2, substitution reactions of Square planar complexes - Trans effect and applications of Trans effect.

2. Stability of metal complexes: **4h**

Thermodynamic stability and kinetic stability, factors affecting the stability of metal complexes, Chelate effect, determination of composition of complex by Job's method and mole ratio method.

3. Bioinorganic chemistry: **4h**

Essential elements, biological significance of Na, K, Mg, Ca, Fe, Co, Ni, Cu, Zn and Cl^{-}.

Metalloporphyrins – Structure and functions of hemoglobin, and Chlorophyll.

ORGANIC CHEMISTRY

UNIT-II

Carbohydrates: **10h**

Monosaccharides: (+) Glucose (aldo hexose) - Evidence for cyclic structure of glucose (some negative aldehydes tests and mutarotation) - Proof for the ring size (methylation, hydrolysis and oxidation reactions) - Pyranose structure (Haworth formula and chair conformational formula). (-) Fructose (ketohexose) - Evidence of 2 - ketohexose structure (formation of penta acetate, formation of cyanohydrin its hydrolysis and reduction by HI). Cyclic structure for fructose (Furanose structure and Haworth formula) - osazone formation from glucose and fructose – Definition of anomers with examples. Interconversion of Monosaccharides: Aldo pentose to Aldo hexose (Arabinose to D- Glucose, D-Mannose) (Kiliani - Fischer method). Epimers, Epimerization - Lobry de bruyn van Ekenstein rearrangement. Aldo hexose to Aldo pentose (D-Glucose to D- Arabinose) by Ruff degradation. Aldo hexose to Ketohexose [(+) Glucose to (-) Fructose] and Ketohexose to Aldo hexose (Fructose to Glucose)

Amino acids and proteins **9h**

Introduction: Definition of Amino acids, classification of Amino acids into alpha, beta, and gamma amino acids. Natural and essential amino acids - definition and examples, classification of alpha amino acids into acidic, basic and neutral amino acids with examples. Methods of

synthesis: General methods of synthesis of alpha amino acids (specific examples - Glycine, Alanine, valine and leucine) by following methods: a) from halogenated carboxylic acid b) Malonic ester synthesis c) strecker's synthesis. Physical properties: Zwitter ion structure - salt like character - solubility, melting points, amphoteric character, definition of isoelectric point. Chemical properties: General reactions due to amino and carboxyl groups - lactams from gamma and delta amino acids by heating peptide bond (amide linkage). Structure and nomenclature of peptides and proteins.

PHYSICAL CHEMISTRY

UNIT-III

1. Chemical kinetics **8h**

Rate of reaction - Definition of order and molecularity. Derivation of rate constants for first, second, third and zero order reactions and examples. Derivation for time half change. Methods to determine the order of reactions. Effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy.

2. Photochemistry **6h**

Difference between thermal and photochemical processes. Laws of photochemistry- Grothus-Draper's law and Stark-Einstein's law of photochemical equivalence. Quantum yield-Photochemical reaction mechanism- hydrogen- chlorine, hydrogen- bromine reaction. Qualitative description of fluorescence, phosphorescence, Photosensitized reactions- energy transfer processes (simple example)

List of Reference Books

1. Concise coordination chemistry by Gopalan and Ramalingam
2. Coordination Chemistry by Basalo and Johnson
3. Organic Chemistry by G.Mare loudan, Purdue Univ
4. Advanced Physical Chemistry by Atkins
5. Text book of physical chemistry by S Glasstone
6. Instrumentation and Techniques by Chatwal and Anand
7. Essentials of Nano chemistry by Pradeep
8. A Textbook of Physical Chemistry by Puri and Sharma
9. Advanced physical chemistry by Gurudeep Raj

V – SEMESTER CHEMISTRY Paper-VI

Weightage to content

S.No	Course Content	Long Answer	Short Answer(SA)	Very short Answer(VSA)	Total no.of questions	Total no.of marks
	Inorganic Chemistry					
1	Reactivity of Metal Complex	1	2		3	18
2	Stability of metal complexes	1	1		2	14
3	Bio inorganic Chemistry	1		1	2	12
	Organic Chemistry					
1	Carbohydrates	2	2	1	5	30
2	Amino Acids	1	1	1	3	16
	Physical Chemistry					
1	Chemical Kinetics	2	2	1	5	30
2	Photo Chemistry	1	1	1	3	16
	Total	9	9	5	23	136

P.R.COLLEGE (A), KAKINADA

III YEAR BSC-(Examination at the end of V semester) model paper

(Inorganic, Organic & Physical chemistry)

Paper-VI

Time:3Hrs Max.Marks:70M

Answer any FOUR questions choosing at least one question from each section

SECTION-I **4x10=40M**

1. Explain SN^1 and SN^2 substitution reactions in Octahedral complexes.

2. Explain determination of the composition of metal complexes by job' s method.

3. i) Explain the biological signification of Na,K

   ii) Explain the Structure of Chlorophyll

SECTION-II

4. Establish the Open chain structure of Glucose with relevant chemical equations.

5. Explain

   i) Killiani-Fischer synthesis ii) Ruff degradation

6. What are Amino Acids. Write the preparation of α-amino acids from

   i) Streckers synthesis ii) Malonic ester synthesis iii) Gabriel phthalamide synthesis

SECTION-III

7. a) Derive the rate constant equation for first order reaction.

b) The rate constant for the certain first order reaction is $1x10^{-5}$ sec^{-1}. Calculate the time taken for the 20% completion of the reaction.

8. Define the terms ‘ order’ and ‘ molecularity’ .Explain any two methods for the determination of order of a reaction.

9. What is meant by quantum yield? State and explain laws of photochemistry.

SECTION-IV

Answer any **Five** questions 4x5=20M

10. Explain Chelate effect.

11. What is Trans effect? Write any two applications of Trans effect.

12. Explain mutarotation of Glucose.

13. Explain the formation of Glucosazone.

14. Write a note on isoelectric point.

15. Write a temperature effect on the rate of a reaction.

16. Discuss about Zero order reaction.

17. Explain Jablonski diagram.

18. What are labile and inert complexes. give examples.

SECTION-V

Answer ALL questions 5x2=10M

19. Write the importance of Fe^{+2} in biological system.

20. What is Zwitter ion. Give an example.

21. What are epimers? Give one example.

22. Write brief notes on i) Fluorescence ii) Phosphorescence

23. Define Half-life.

LABORATORY COURSE – VI

Practical Paper – VI Physical Chemistry

(at the end of semester V) 30 hrs (2 h/W)

1. Determination of rate constant for acid catalyzed ester hydrolysis.
2. Determination of molecular status and partition coefficient of benzoic acid in Benzene and water.
3. Determination of Surface tension of liquid
4. Determination of Viscosity of liquid.
5. Adsorption of acetic acid on animal charcoal, verification of Freundlisch isotherm.