

**A.G& S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS &
SCIENCE**

VUYYURU-521165, KRISHNA Dt., A.P.(Autonomous)

Accredited by NAAC with "A" Grade

2019-2020



DEPARTMENT OF CHEMISTRY

MINUTES OF BOARD OF STUDIES

ODD SEMESTER

16-04-2019

Minutes of the meeting of Board of studies in Chemistry for the Autonomous course of A.G. & S.G.Siddhartha Degree College of Arts & Science, Vuyyuru held at 10.30 A.M on 16-04-2019 in the Department of Chemistry.

Smt A.INDIRA Presiding

Members Present:

- 1)  Chairman
(Smt.A.Indira) HOD, Dept. of Chemistry,
A.G. & S.G.S.Degree College,Vuyyuru.
- 2)  University Nominee
(Prof.D.Ramasekhar Reddy) Assistant Professor,
Dept. of Chemistry,Krishna University, MTM.
- 3)  Academic Council Nominee
(Dr.K.A.Emanuel) Associate Professor in Chemistry,
Sir C.R.Reddy College,Eluru.
- 4)  Academic Council Nominee
(Dr.D.Bala karuna Kumar) Associate Professor in Chemistry,
A.L.C College,Vijayawada.
- 5)  Industrialist
(Dr.Nadella Taraka Ramarao) Manager, Q.C, Divis Laboratories Ltd,
Vizag.
- 6)  Student Nominee
(Dr.V.Phani Kumar) Lecturer in Chemistry,
SRR&CVR Govt. Degree College, BZA.
- 7)  Member
(Sri.K.Ramesh) Lecturer in Chemistry,
A.G. & S.G.S.Degree College,Vuyyuru
- 8)  Member
(Smt.B.Navaneeta) Lecturer in Chemistry,
A.G. & S.G.S.Degree College,Vuyyuru.
- 9)  Member
(Smt.M.V.Santhi) Lecturer in Chemistry,
A.G.& S.G.S.Degree College, Vuyyuru.
- 10)  Member
(Sri.G.Ramesh) Lecturer in Chemistry,
A.G.& S.G.S.Degree College,Vuyyuru.
- 11)  Member
(Sri.J.Nageswara Rao) Rtd.Lecturer in Chemistry,
A.G.& S.G.S.Degree College,Vuyyuru.

Agenda for B.O.S Meeting

1. To recommend the syllabus and model paper for I semester of I Degree B.Sc., Chemistry for the Academic year 2019-2020.
2. To recommend the syllabus and model papers for III semester of II Degree B.Sc., Chemistry for the Academic year 2019-2020.
3. To recommend the syllabus and model papers for V semester of III Degree B.Sc. Chemistry for the Academic year 2019-2020.
4. To recommend the Blue print of I,III,V semesters of B.Sc. Chemistry for the Academic year 2019-2020.
5. To recommend the Guidelines to be followed by the question paper setters in Chemistry for I, III, V Semester – end exams.
6. To recommend the teaching and evaluation methods to be followed under Autonomous status.
7. Any suggestions regarding certificate course, seminars, workshops, Guest lecture to be organized.
8. Recommend the panel of paper setters and Examiners to the controller of Examinations of autonomous Courses of A.G. & S.G.S.Degree colleges of Arts & Science, Vuyyuru.
9. Any other matter.


A. A. S. Chairman.

RESOLUTIONS

- 1) It is resolved to continue the same **syllabus and model paper for I semesters of I B.Sc.** under Choice Based Credit System (CBCS) for the Academic year 2019-20.
- 2) It is resolved to implement the same **syllabus and model papers** under Choice Based Credit System (CBCS) for the Academic year 2019-20 for **III semester of II B.Sc.**
- 3) It is resolved to implement the same **syllabus and model papers** under Choice Based Credit System (CBCS) for the Academic year 2019-20 for **V semester of III B.Sc.**
- 4) It is resolved to follow the **Blue prints** of I, III semesters of Degree B.Sc. for the Academic year 2019-20. It is resolved to continue the same **Blue prints** of V semesters of Degree B.Sc. for the Academic year 2019-20.
- 5) It is resolved to follow the **guidelines** to be followed by the question paper setters of Chemistry for I,III semesters of Degree B.Sc. for the Academic Year 2019-20. It is resolved to continue the same **guidelines** to be followed by the question paper setters of Chemistry for V semester of Degree B.Sc. for the Academic Year 2019-20.
- 6) It is resolved to continue the following teaching and evaluation methods for Academic year 2019-20.

Teaching Methods:

Besides the conventional methods of teaching, we use modern technology i.e. using of LCD projector to display on U boards etc, for better understanding of concepts.

Evaluation of a student is done by the following procedure:

● Internal Assessment Examinations:

- Out of maximum 100 marks in each paper for I, II B.Sc, 30 marks shall be allocated for internal assessment.
- Out of these 30 marks, **20 marks are allocated for announced tests (i.e.IA-1 & IA-2)**. Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, **5 marks** are allocated on the basis of candidate's **percentage of attendance and remaining 5 marks are allocated for the innovative component like assignment/quiz/seminars for IB.Sc.**
- There is **no pass minimum** for internal assessment for I, II B.Sc.
- Out of maximum 100 marks in each paper for III B.Sc, 25 marks shall be allocated for internal assessment.
- Out of these 25 marks, **15 marks are allocated for announced tests (i.e.IA-1 & IA-2)**. Two announced tests will be conducted and average of these two tests shall be deemed as the marks obtained by the student, **5 marks** are allocated on the basis of candidate's **percentage of attendance and remaining 5 marks are allocated for the assignment for III B.Sc.**
- Semester – End Examination:
- The maximum mark for I, II B.Sc Semester – End examination shall be 70 marks and duration of the examination shall be 3 hours. Even though the candidate is absent for two IA exams /obtain Zero marks the external marks are considered (if the candidate gets 40/70) and the result shall be declared as "PASS".
- The maximum marks for III B.Sc Semester – End examination shall be 75 marks and duration of the examination shall be 3 hours.
- Semester – End examinations shall be conducted in theory papers at the end of every semester, while in practical papers, these examinations are conducted at the end of I,III, & V semesters **for I, II & III B.Sc.**

- 7) Discussed and recommended for organizing **certificate course, seminars, Guest lecturers, workshops** to upgrade the knowledge of students, for the approval of the academic council.
- 8) Discussed and empowered the Head of the department of Chemistry to suggest the panel of paper setters and examiners to the controller of examinations.
- 9) NIL.


.....Chairman

SEMESTER-I	PAPER CODE : CHE-101C
PAPER TITLE : INORGANIC ,ORGANIC &PHYSICAL CHEMISTRY, PAPER – I	

TOTAL PERIODS - 60 (4hrs/week) Credits – 3

INORGANIC CHEMISTRY

UNIT –I

P-block elements –I Marks weightage (10 + 10 + 5) **15h**

- **Group-13:** Synthesis and structure of diborane .
- Structures of higher boranes(B_4H_{10} and B_5H_9)
- boron-nitrogen compounds ($B_3N_3H_6$ and BN) Structure and Synthesis.
- **Group - 14:** Silicones Defination, Classification,Preparation(Straightchain,Cyclic,& Cross linked),Types Of Silicones and Applications of Silicones(uses).
- **Group - 15:** Preparation, reactions and Structure of hydrazine.
Preparation, reactions and Structure of hydroxylamine.

UNIT-II

P-block elements –II Marks weightage (10 + 5)

8h

- **Group - 16:** Classifications of oxides based on (i) Chemical behaviour and (ii) Oxygen content.
- **Group-17:** Inter halogen compounds(AX, AX_3, AX_5 & AX_7 Types)
- Pseudo halogens. (Preparation & Properties)

2. Organometallic Chemistry Marks weightage (10 + 5) **7h**

- Definition - classification of Organometallic compounds - nomenclature, preparation, properties and applications of alkyls of Li and Mg.

ORGANIC CHEMISTRY

UNIT-III

Structural theory in Organic Chemistry Marks weightage (10 + 10 + 5) **10h**

- Types of bond fission & Organic reagents-Examples (electrophiles, nucleophiles & free radicals including neutral molecules).Types of Carbenes and Nitrenes.
- Electron displacement effects in covalent bonds-Inductive effect-applications-Basicity of amines, acidity of carboxylic acids and stability of carbonium ions.
- Mesomeric / Resonance effect- applications- acidity of Phenol & carboxylic acids.
Hyper conjugation-applications.
- Types of Organic reactions-Addition, Substitution & Elimination reactions.

UNIT-IV

1. Acyclic Hydrocarbons

Marks weightage(5 + 5)

6h

- **Alkenes** - Preparation of alkenes. Properties: Addition of hydrogen - heat of

hydrogenation and stability of alkenes. Addition of halogen and its mechanism. Addition of HX, Markonikov's rule, addition of H₂O, HOX, H₂SO₄ with mechanism and addition of HBr in the presence of peroxide (anti - Markonikov's addition). Dienes - Types of dienes, reactions of conjugated dienes - 1,2 and 1,4 addition of HBr to 1,3 - butadiene and Diel's - Alder reaction.

- **Alkynes** - Preparation by dehydrohalogenation of dihalides, dehalogenation of

tetrahalides, Properties; Acidity of acetylenic hydrogen (formation of Metal acetylides). Preparation of higher acetylenes, Metal ammonia reductions, Physical properties. Chemical reactivity - electrophilic addition of X₂, HX, H₂O (Tautomerism), Oxidation with KMnO₄, OsO₄, reduction and Polymerisation reaction of acetylene.

2. Alicyclic hydrocarbons (Cycloalkanes) Weightage (10)

4h

Nomenclature, Preparation by Freund's method, Wislicenus method. Properties - reactivity of cyclopropane and cyclobutane by comparing with alkanes, Stability of cycloalkanes - Baeyer's strain theory, Sachse and Mohr predictions and Pitzer's strain theory. Conformational structures of cyclobutane, cyclopentane, cyclohexane.

UNIT-V Weightage (10+5)

Benzene and its reactivity

10h

- Concept of resonance, resonance energy. Heat of hydrogenation, heat of combustion of Benzene, mention of C-C bond lengths and orbital picture of Benzene.
- Concept of aromaticity - aromaticity (definition), Huckel's rule - application to Benzenoid (Benzene, Naphthalene) and Non - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation)
- Reactions - General mechanism of electrophilic substitution, mechanism of nitration,
- Friedel Craft's alkylation
- Friedel Craft's acylation.
- Orientation of aromatic substitution - Definition of ortho, para and meta directing groups. Ring activating and deactivating groups with examples
- (Electronic interpretation of various groups like NO₂ and Phenolic).
- Orientation of (i) Amino, methoxy and methyl groups (ii) Carboxy, nitro, nitrile, carbonyl and sulphonic acid groups (iii) Halogens (Explanation by taking minimum of one example from each type)

List of Reference Books

1. Inorganic Chemistry by J.E. Huheey
2. Basic Inorganic Chemistry by Cotton and Wilkinson
3. A textbook of qualitative inorganic an

SEMESTER - I	PAPER CODE : CHE-101C
PAPER TITLE : INORGANIC AND ORGANIC CHEMISTRY, PAPER-I	

Time: 3Hours

Maximum marks: 70

Pass marks: 28

SECTION-A

Answer any **FOUR** of the following. Each question carries 5 marks. 4X5=20

1. Write any two preparations and two properties of Hydrazine ?
2. Write a short note on Ferrocene ?
3. How are oxides classified on the basis of Chemical behaviour?
4. What is Mesomeric effect? Explain acidity of carboxylic acids ?
5. Write any two preparation methods of Alkenes?
6. Explain about Diel's-Alder reaction with one example?
7. Explain about reaction and mechanism of Nitration of benzene?

SECTION-B

Answer **any FIVE** questions. Each question carries 10 marks. 5X10=50

8. Explain about preparations, structure and properties of Borazole ?
9. What are silicones ? How they are classified? Write any two methods of preparation of silicones?
10. What are Inter Halogen Compounds? Write the structures of AX_3, AX_5 ?
11. What is Grignard reagent ? write any five synthetic applications?
12. Write about Hyper conjugation and Resonance effect with each one example?
13. Explain the following a. Carbenes b. Nitrenes
14. Write the conformational structures of Cyclobutane, Cyclopentane?
15. Define orientation effect? What are ortho ,meta,para directing groups?

**The Guidelines to be followed by the question paper setters in chemistry for the
I-Semester - end exams** **ACADEMIC YEAR-2019-20**

SEMESTER-I	PAPER CODE : CHE-101C
PAPER TITLE : INORGANIC & ORGANIC CHEMISTRY, PAPER – I	

Weightage for the question paper

syllabus	Section-A (Short answer questions)	Section-B (essay questions)
Unit-1 (25 Marks)	1	1 + 1
Unit-2 (30 Marks)	1+1	1 + 1
Unit-3 (25 Marks)	1	1 + 1
Unit-4 (20Marks)	1 + 1	1
Unit-5 (15Marks)	1	1

- Each Short answer question carries 5 marks in Section –A
- Each Essay question carries 10 marks in Section –B
- The Question papers setters are requested to cover all the topics in the syllabus stipulated as per the weightage given by us.

Simple Salt Analysis

PAPER CODE : CHE-101P

Salt mixture Analysis

30 hrs (2h / w)

Credits: 2

Analysis of salt mixture containing two anions and two cations from the following.

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

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

1. Analysis of simple salt-I
2. Analysis of simple salt-II
3. Analysis of simple salt-III
4. Analysis of simple salt-IV
5. Analysis of simple salt-V
6. Analysis of simple salt-VI

SCHEME OF VALUATION

INTERNAL MARKS

- Record =10 M

EXTERNAL MARKS (40)

- Viva questions = 10 M

PRACTICAL EXAMINATION (30M)

- Identification of anion 6M
- Confirmation test for anion 6 M
- Group separation table with correct group 10 M
- Confirmation test for cation 5M
- Report 3 M

TOTAL: 30 M

SEMESTER – III	SUBJECT: CHEMISTRY	PAPER CODE: CHE-301C
PAPER TITLE : INORGANIC, ORGANIC PHYSICAL CHEMISTRY, PAPER - III		

INORGANIC CHEMISTRY

60 hrs (4 h / w) Credits - 3

UNIT – I

Theories of bonding in metals:

- Metallic properties and its limitations, Valence bond theory, Free electron theory, Explanation of thermal and electrical conductivity of metals, limitations,
- Band theory, formation of bands, explanation of conductors, semiconductors and insulators.

UNIT – II

1. Metal carbonyls

- Effective atomic number(EAN), Calculation of EAN of metal atom. classification of metal carbonyls, structures and shapes of metal carbonyls of V, Cr, Mn, Fe, Co and Ni.

2. Organometallic Chemistry

- Definition - classification of Organometallic compounds - nomenclature, preparation and applications of alkyls of Li and Mg.

ORGANIC CHEMISTRY

UNIT-III

Carbonyl compounds

- Nomenclature of aliphatic and aromatic carbonyl compounds, structure of the carbonyl group. Synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3-dithianes, synthesis of ketones from nitriles and from carboxylic acids.
- **Physical properties:** Reactivity of carbonyl group in aldehydes and ketones.
- **Nucleophilic addition reaction** with a) NaHSO₃, b) HCN, c) RMgX, d) NH₂OH, e) PhNHNH₂, f) 2,4-DNPH, g) Alcohols-formation of hemiacetal and acetal.
- **Base catalysed reactions:** a) Aldol, b) Cannizzaro reaction, c) Perkin reaction, d) Benzoin condensation, e) Haloform reaction, f) Knoevenagel reaction.
- Oxidation of aldehydes- Baeyer-Villiger oxidation of ketones.
- **Reduction:** Clemmensen reduction, Wolf-Kishner reduction, MPV reduction, reduction with LiAlH₄ and NaBH₄.
- **Analysis of aldehydes and ketones** with a) 2,4-DNT test, b) Tollen's test, c) Fehling test, d) Schiff's test, e) Haloform test (with equation)

UNIT-IV

1. Carboxylic acids and derivatives

- Nomenclature, classification and structure of carboxylic acids. Methods of preparation by a) Hydrolysis of nitriles, amides b) Hydrolysis of esters by acids and bases with mechanism c) Carbonation of Grignard reagents.
- Special methods of preparation of aromatic acids by a) Oxidation of side chain. b) Hydrolysis by benzotrichlorides. c) Kolbe reaction.
- **Physical properties:** Hydrogen bonding, dimeric association, acidity- strength of acids with examples of trimethyl acetic acid and trichloroacetic acid. Relative differences in the acidities of aromatic and aliphatic acids.
- **Chemical properties:** Reactions involving H, OH and COOH groups- salt formation, anhydride formation, acid chloride formation, amide formation and esterification(mechanism). Degradation of carboxylic acids by Huns-Diecker reaction, decarboxylation by Schimdt reaction, Arndt-Eistert synthesis, halogenation by Hell-Volhard- Zelinsky reaction.

2. Active methylene compounds

- **Acetoacetic esters:** keto-enol tautomerism, preparation by Claisen condensation, Acidhydrolysis and ketonic hydrolysis.
- Preparation of a) monocarboxylic acids(Acetic acid, Propaonic acid). b) Dicarboxylic acids(Succinic acid, Adipic acid).C)Reaction with urea
- **Malonic ester:** preparation from acetic acid.
Synthetic applications: Preparation of a) monocarboxylic acids (propionic acid and n-butyric acid). b) Dicarboxylic acids (succinic acid and adipic acid) c) α,β -unsaturated carboxylic acids (crotonic acid).Reaction with urea.

PHYSICAL CHEMISTRY

UNIT-V

Dilute solutions

- Colligative properties. Raoult's law, relative lowering of vapour pressure, its relation to molecular weight of non-volatile solute. Experimental method-Ostwald method.
- Elevation of boiling point , Derivation of relation between molecular weight and elevation in boiling point, Experimental method –Cottrell's method
- Depression in freezing point. Derivation of relation between molecular weight and depression in freezing point, Experimental method – Beckmann's method.
- Osmosis,osmotic pressure, Determination of molecular weight of non-volatile solute from osmotic pressure. Experimental method-Berkeley-Hartley method. Abnormal Colligative properties- Van't Hoff factor.

List of Text Books

1. Selected topics in inorganic chemistry by W.D.Malik, G..D.Tuli,R.D.Madan
2. Inorganic Chemistry J E Huheey, E A Keiter and R L Keiter
3. A Text Book of Organic Chemistry by Bahl and Arun bahl
4. A Text Book of Organic chemistry by I L Finar Vol I
5. Telugu Academy Textbook of Chemistry Vol- II (English medium)
6. Unified chemistry Vol- II by O.P.Agarwal
7. Unified chemistry Vol- II by K.Ramarao and Y. R. Sharma (KalyaniPublishers)

List of Reference Books

1. Organic chemistry by Bruice
2. Organic chemistry by Clayden
3. Advanced Inorganic chemistry by Gurudeep Raj
4. Basic Inorganic Chemistry by Cotton and Wilkinson
5. Concise Inorganic Chemistry by J.D.Lee
6. Pradeep's chemistry vol- I & II

SEMESTER – III	PAPER CODE : CHE-301C
PAPER TITLE : INORGANIC AND ORGANIC CHEMISTRY, PAPER-III	

Time: 3Hours

Maximum marks: 75

Pass marks: 30

SECTION-A

Answer any FIVE of the following. Each question carries 5 marks. 5X5=25

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION-B

Answer any FIVE questions. Each question carries 10 marks. 5X10=50

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

**The Guidelines to be followed by the question paper setters in chemistry for the
III- Semester - end exams**

SEMESTER – III	PAPER CODE : CHE-301C
PAPER TITLE : INORGANIC AND ORGANIC CHEMISTRY, PAPER-III	

Weightage for the question paper

syllabus	Section-A (Short answer questions)	Section-B (essay questions)
Unit-1 (25 Marks)	1	1 + 1
Unit-2 (20 Marks)	1 + 1	1
Unit-3 (30 Marks)	1 + 1	1+1
Unit-4 (15 Marks)	1	1
Unit-5 (30 Marks)	1 +1	1 + 1

- Each Short answer question carries 5 marks in Section –A
- Each Essay question carries 10 marks in Section –B
- The Question papers setters are requested to cover all the topics in the syllabus stipulated as per the weightage given by us.

Organic qualitative analysis-I	PAPER CODE : CHE-301 P
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PRACTICAL SYLLABUS

30 hrs. (2h / w), Credits-2

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 .

Alcohols, Phenols, Aldehydes, Ketones, ,Carboxylic acids,

SCHEME OF VALUATION

1. INTERNAL MARKS- Record-10M

2. EXTERNAL MARKS-40

- Analysis of an organic compound and preparation of suitable derivative-30M
- Viva questions = 10 M

TOTAL = 50 M

SEMESTER – V	SUBJECT: CHEMISTRY	COURSE CODE: CHE-501C
PAPER TITLE : INORGANIC,ORGANIC & PHYSICAL CHEMISTRY, Paper –V		

60 hrs(4h/w)

Credits-3

INORGANIC CHEMISTRY

UNIT – I

Coordination Chemistry: (10+10+5)

12h

IUPAC nomenclature - bonding theories - Review of Werner's theory and Sidgwick's Concept of coordination - Valence bond theory - geometries of coordination numbers 4-tetrahedral and square planar and 6-octahedral and its limitations, crystal field 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: (10+5)

5h

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

2. Stability of metal complexes: (10+5)

6h

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.

ORGANIC CHEMISTRY

UNIT- III

Nitro hydrocarbons: (10+5)

5h

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

UNIT – IV

Nitrogen compounds: (10+10+5)

16h

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). Electrophilic substitution of Aromatic amines – Bromination and Nitration. Oxidation of aryl and Tertiary amines, Diazotization.

PHYSICAL CHEMISTRY

UNIT- V

Thermodynamics (10+5+5+5)

16h

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. 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 G.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

SEMESTER – V	PAPER-V	PAPER CODE : CHE-501C
PAPER TITLE : INORGANIC,ORGANIC & PHYSICAL CHEMISTRY		

Time: 3Hours

Maximum marks: 75

Pass marks: 30

SECTION-A

Answer any FIVE of the following. Each question carries 5 marks. 5X5=25

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION-B

Answer any FIVE questions. Each question carries 10 marks. 5X10=50

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

**The Guidelines to be followed by the question paper setters in chemistry for the
V- Semester - end exams**

SEMESTER – V	SUBJECT: CHEMISTRY	COURSE CODE: CHE-501C
PAPER TITLE : INORGANIC,ORGANIC & PHYSICAL CHEMISTRY, Paper –V		

Weightage for the question paper

syllabus	Section-A (Short answer questions)	Section-B (essay questions)
Unit-1 (25 Marks)	1	1 + 1
Unit-2 (30 Marks)	1 + 1	1+1
Unit-3 (15 Marks)	1	1
Unit-4 (25 Marks)	1	1 + 1
Unit-5 (25 Marks)	1 +1+1	1

- Each Short answer question carries 5 marks in Section –A
- Each Essay question carries 10 marks in Section –B
- The Question papers setters are requested to cover all the topics in the syllabus stipulated as per the weightage given by us.

PRACTICAL SYLLABUS

Practical Paper – V Organic Qualitative Analysis	PAPER CODE : CHE-501 P
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30 hrs (2 h/W) Credits: 2

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 .

Alcohols, Phenols, Aldehydes, Ketones, Carbohydrates,
Carboxylic acids, Aromatic Primary Amines.

SCHEME OF VALUATION

1. INTERNAL MARKS- Record-10M

2. EXTERNAL MARKS-40

- Analysis of an organic compound and preparation of suitable derivative-30M
- Viva questions = 10 M

TOTAL = 50 M

SEMESTER – V	Paper – VI	SUBJECT: CHEMISTRY	PAPER CODE: CHE-502C
PAPER TITLE : INORGANIC,ORGANIC & PHYSICAL CHEMISTRY			

60 hrs (4h/w) Credits-3

INORGANIC CHEMISTRY

UNIT-I

1. Reactivity of metal complexes: (10+5)

5h

Labile and inert complexes, ligand substitution reactions - SN^1 and SN^2 , substitution reactions of square planar complexes - Trans effect and applications of trans effect.

2. Bioinorganic chemistry: (10)

5h

Essential elements, biological significance of Na, K, Mg, Ca, Fe, Co, Ni, Cu, Zn and Cl-. Metalloporphyrins – Structure and functions of hemoglobin, Myoglobin and Chlorophyll.

ORGANIC CHEMISTRY

UNIT- II

Heterocyclic Compounds (10+5)

8h

Introduction and definition: Simple five membered ring compounds with one hetero atom
Ex. Furan. Thiophene and pyrrole - Aromatic character – Preparation from 1,4,-dicarbonyl compounds, Paul-Knorr synthesis.

Properties : Acidic character of pyrrole - electrophilic 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.

UNIT-III

Carbohydrates (10+5+5+5)

12h

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 pentaacetate, 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: Aldopentose to Aldohexose (Arabinose to D- Glucose, D-Mannose) (Kiliani - Fischer method). Epimers, Epimerisation - Lobry de bruyn van Ekenstein rearrangement. Aldohexose to Aldopentose (D-Glucose to D- Arabinose) by Ruff degradation. Aldohexose to Ketohexose [(+) Glucose to (-) Fructose] and Ketohexose to Aldohexose (Fructose to Glucose)

UNIT- IV

Amino acids and proteins (10+10+5)

12h

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-V

1. Chemical kinetics (10+5)

9h

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 (10+5)

9h

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
7. Instrumentation and Techniques by Chatwal and Anand
8. Essentials of nano chemistry by pradeep
9. A Textbook of Physical Chemistry by Puri and Sharma
10. Advanced physical chemistry by Gurudeep Raj.

SEMESTER – V	PAPER-VI	PAPER CODE : CHE-502C
PAPER TITLE : INORGANIC,ORGANIC & PHYSICAL CHEMISTRY		

Time: 3Hours

Maximum marks: 75

Pass marks: 30

SECTION-A

Answer any FIVE of the following. Each question carries 5 marks. 5X5=25

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION-B

Answer any FIVE questions. Each question carries 10 marks. 5X10=50

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

**The Guidelines to be followed by the question paper setters in chemistry for the
V- Semester - end exams**

SEMESTER – V	SUBJECT: CHEMISTRY	PAPER CODE: CHE-502C
PAPER TITLE : INORGANIC,ORGANIC & PHYSICAL CHEMISTRY, Paper – VI		

Weightage for the question paper

syllabus	Section-A (Short answer questions)	Section-B (essay questions)
Unit-1 (25 Marks)	1	1 + 1
Unit-2 (15 Marks)	1	1
Unit-3 (25 Marks)	1 + 1+1	1
Unit-4 (25 Marks)	1	1 + 1
Unit-5 (30 Marks)	1 +1	1 + 1

- Each Short answer question carries 5 marks in Section –A
- Each Essay question carries 10 marks in Section –B
- The Question papers setters are requested to cover all the topics in the syllabus stipulated as per the weightage given by us.

PRACTICAL SYLLABUS

Practical Paper –VI Physical Chemistry	COURSE CODE : CHE-502 P
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30 hrs (2 h/W) Credits: 2

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 oxalic acid on silica gel , verification of Freundlich isotherm.

SCHEME OF VALUATION

1. INTERNAL MARKS- Record-10M

2. EXTERNAL MARKS-40

- Practical-30
- Viva-10

TOTAL = 50 M