S.R.R. & C.V.R.GOVT. DEGREE COLLEGE (Autonomous)

VIJAYAWADA – 520 004

Minutes of the meeting of the Board of Studies in the Subject of Chemistry

The meeting of the Board of Studies in the subject Chemistry was held on 19th April 2017 in the Department of Chemistry, SRR & CVR Government Degree College (Autonomous), Vijayawada 520004.

The Following members attended the meeting:

1.	Kothapalli Srinivas	(In-Charge of the Department & Chairman, BoS)
2.	Dr.D.Rama Sekhar Reddy	(University Nominee)
3.	Dr. Md.Pacha	(Subject Expert)
4.	Dr.V.Samba Siva Rao	(Subject Expert)
5.	B.V.Ramesh	(Special Member)
6.	Dr.G.Venkat Rao	(Faculty Member)
7.	Dr. V.Neeraja	(Faculty Member)
8.	Dr.G.Nagarjuna	(Faculty Member)
9.	Dr.V.Phani Kumar	(Faculty Member)
10.	K.V.S.Prasad	(Faculty Member)

AGENDA:

Item 1 : Approval of syllabus for Semester I and II for the academic Year 2017-18
Item 2 : Approval of Question paper blue print and model paper
Item 3 : Approval of list of paper setters and examiners
Item 4 : Any other item with the approval of the chair.

The Chairperson, Board of Studies welcomed the members and initiated discussion on the syllabus for I and II year semesters. He apprised the members of the guidelines of the UGC and the CCE regarding the framing of syllabus, and the recommended evaluation ratio for internal and external examinations. The members discussed in detail the various aspects presented before them and unanimously resolved the following:

Resolutions:

1. Resolved to adopt the present University CBCS syllabus for semester I and II with the suggested modifications.
2. Resolved to approve the division of marks for internal and external examination along with the suggested blue print and model paper.
3. Resolved to approve the list of paper setters and examiners submitted by the department.

Syllabus for CBCS Semester I

Question paper Blue Print

Model Question paper

Syllabus for CBCS Semester II

Question Paper Blue Print

Model Question Paper

List of paper setters and examiners

Signature of the members of the BoS:

1.	Kothapalli Srinivas	(In-Charge of the Department & Chairman, BoS)
2.	Dr.D.Rama Sekhar Reddy	(University Nominee)
3.	Dr. Md.Pacha	(Subject Expert)
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9.	Dr.V.Phani Kumar	(Faculty Member)
10.	K.V.S.Prasad	(Faculty Member)

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VIJAYAWADA
Chemistry Syllabus (From 2017-18)
SEMESTER - I
Paper I - Inorganic & Organic Chemistry 60hrs (4h/w)

INORGANIC CHEMISTRY 30hrs (2h/w)

UNIT -I

p-black elements — I 15 h

Group- 13: Synthesis and structure of diborane and higher boranes (B_4H_{10} and B_5H_9), boron-nitrogen compounds ($B_3N_3H_6$ and BN)

Group -14: Preparation and applications of silanes and silicones.

Group -15: Preparation and reactions of hydrazine, hydroxylamine.

UNIT-II

1. p-block elements- II 8 h

Group - 16: Classifications of oxides based on (i) Chemical behaviour and (ii) Oxygen content.

Group -17: Inter halogen compounds and pseudo halogens.

2. Chemical Bonding 7 h

Valence bond theory, hybridization, VB theory as applied to ClF_3, $Ni(CO)_4$, Molecular orbital theory – LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N_2, O_2, CO and NO)

ORGANIC CHEMISTRY 30hrs (2h /w)

UNIT-III

Structural theory in Organic Chemistry 10 h

Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radical reagents including neutral molecules like H_2O, NH_3 & $AlCl_3$).

Bond polarization : Factors influencing the polarization of covalent bonds, eletro negativity - inductive effect. Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance or Mesomeric effect, application to (a) acidity of phenol, and (b) acidity of carboxylic acids. Hyper conjugation and its application to stability of carbonium ions, Free radicals and alkenes, carbanions, carbenes and nitrenes.

Types of Organic reactions : Addition - electrophilic, nucleophilic and free radical. Substitution - electrophilic, nucleophilic and free radical. Elimination- Examples.

UNIT-IV **6 h**

1. Acyclic Hydrocarbons

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 H_2O, HOX, H_2SO_4 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 X_2, HX, H_2O (Tautomerism), Oxidation with $KMnO_4$, OsO_4, reduction and Polymerisation reaction of acetylene.

4 h

2. Alicyclic hydrocarbons (Cycloalkanes)

Nomenclature, Preparation by Freunds 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 **10h**

Benzene and its reactivity

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 and 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 NO_2 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 analysis by A.I. Vogel
4. Organic Chemistry by Morrinson and Boyd
5. A Text Book of Organic chemistry by I L Finar Vol I
6. Concise Inorganic Chemistry by J.D.Lee

LABORATORY COURSE-I 30 hrs (2 h / w)

Practical-I Simple Salt Analysis

(At the end of Semester-I)

Qualitative Inorganic analysis

Analysis of simple salt containing one anion and cation from the following

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

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

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Weightage to content Chemistry
(Inorganic and Organic Chemistry)

1st Year – I-Semester

Sl.No.	TOPIC	ESSAY	SHORT
1.	Group – 13,14,15	2	2
2.	Group – 16,17 Chemical Bonding	2	2
3.	Structural Theory in Organic Chemistry	2	2
4.	Alicyclic Hydrocarbons	2	2
5.	Benzene and its Reactivity	2	2

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Inorganic& Organic chemistry **Semester – I** **Max.marks : 60**

Section-A

Answer any **FIVE** questions 5 x 4 = 20 marks

1. Discuss the structure of Diborane.
2. Write any two preparative methods of Hydrazine.
3. Classify the oxides based on the oxygen content with one example to each.
4. Explain the structure of $Ni(CO)_4$
5. write a note on Diels –Alder reaction.
6. write a short note on Carbenes.
7. Explain the relative stability of Carbo cations
8. Explain Pitzer's strain theory briefly.
9. Write a short note on Huckel;s rule with examples.
10. Explain the mechanism of friedel craft's alkylation .

Section-B

Answer **ALL Five** questions 5 x 8 = 40 marks

11. write a note on preparation and properties of silicones .

(Or)

Explain the preparation and oxidation reduction reactions of hydroxyl amine.

12. Give an account on different types of Inter halogen compounds.

(Or)

State the main features of M.O theory .Draw the M.O diagram of O_2 and explain the bond order and magnetic nature of O_2.

13. Describe the different types of organic reactions with suitable examples .

(Or)

Write a note on the following.

a) Mesomeric effect b) Inductive effect c) Hyper conjugation

14. Explain the addition of these reagents to alkenes with mechanisms.

a) H_2O b) HOCl c) H_2SO_4

(Or)

Explain Baeyer's strain theory with examples.

15. Describe the Structure of Benzene.

(Or)

Explain the orientation of benzene with respect to alkyl and nitro groups.

SEMESTER - II

Paper II (Physical & General Chemistry) **60 hrs. (4h/w)**

PHYSICAL CHEMISTRY

30 hrs (2h / w)

UNIT-I **10h**

Solidstate

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 **6 h**

1.Gaseous state

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.

4 h

2.Liquid state

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 **10h**

Solutions

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

1.Surface chemistry **8 h**

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, chemiorption. Freundlisch, Langmuir adsorption isotherms. Applications of adsorption

2. Organometallic Chemistry 7 h

Definition – Classification of Organometallic compounds – nomenclature, preparation, properties and applications of alkyls of Li and Mg.

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 B 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 Bahi and Tuli
10. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan

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, borate, phosphate.

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

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Weightage to content Chemistry
(Inorganic and Organic Chemistry)

1st Year – II-Semester

Sl.No.	TOPIC	ESSAY	SHORT
1.	Solid State	2	2
2.	Gaseous State Liquid State	2	2
3.	Solutions	2	2
4.	Surface Chemistry Organometallic Chemistry	2	2
5.	Stereochemistry of Carban compounds	2	2

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Physical & General chemistry Semester – II Max.marks : 60

Section-A

Answer any FIVE questions 5 x 4 = 20 marks

1. Derive Bragg's equation.
2. Explain the terms Space lattice and unit cell.
3. Explain Joule Thomson effect.
4. Write applications of Liquid crystals
5. Explain azeotropic mixtures.
6. Explain Raoult's law.
7. Define tyndall effect.
8. Write a short note on Grignard reagents.
9. Define enantiomers and diastereomers.
10. Write a note on types of molecular representations.

Section –B

Answer ALL FIVE questions 5 x 8 = 40 marks

11. Write an essay on types of crystal defects.

(Or)

a) Define Law of constancy of Inter facial angle. b) Explain the law of rational indices.

12 . Explain the relationship between critical constants and van der waal's constants.

(Or)

Define liquid crystals and write the classification of liquid crystals.

13. Explain Nernst's Distribution law and its applications.

(Or)

Explain the basic principle of Steam distillation with diagram.

14. Discuss Freundlisch and Langmuir adsorption isotherms.

(Or)

Describe the method of preparation and properties of alkyl lithium compounds.

15. Explain R-S Configuration with examples.

(Or)

What is optical isomerism ? Explain optical isomers of Glyceraldehyde and Lactic acid.

S.R.R. & C.V.R. Govt. Degree College (Autonomous), Vijayawada

Department of Chemistry

List of Examiners

1. V. Sailaja, PB Siddardha College of Arts & Science, Vijayawada
2. B. Sekhar, GDC, Movva, Krishna Dist.
3. N. Prasad, GDC Movva, Krishna Dist.
4. B. Reddiyya, GDC Tiruvuru, Krishna Dist.
5. K. Rajendra Prasad, GDC Tiruvuru, Krishna Dist.
6. K.R. Manjula, GDC Mylavaram, Krishna Dist.
7. K. Swaroop Singh, GDC Avanigadda, Krishna Dist.
8. Dr. L. Ramana, Andhra Loyola College, Viyayawada
9. K. Rayapu Reddy, Andhra Loyola College, Viyayawada
10. Dr. Y. Hanumantha Rao, Andhra Loyola College, Viyayawada
11. A. Indira, AG & SG College, Vuyyuru, Krishna Dist.
12. S. Seshumutyalu, GDC Tadepalligudem, WG Dist.
13. K. Venkatarao, GDC, Palakol, WG Dist.