KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)
Department of Chemistry

Class:	Semester:	Title of The Paper:	Paper Code:	W.E.F
IBSC (CBZ, MPC, MCCS)	I	INORGANIC AND ORGANIC CHEMISTRY	CBCHE101	2015-16

Syllabus

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory	Practical	3 Hours	CIA	SEE	
	4	3		25	75	

Course Objectives: The objective of this paper is to bring awareness among students on the general characteristics and applications of compounds of p block elements it also gives the general awareness on basic principles of organic chemistry.

Course outcomes:

The student will gain an understanding of

- The periodic properties and reactions of III A, IV A , V A, VI A and VII A group elements.
- The Nomenclature, properties, preparations and applications of organometallic compounds.
- The types of organic reagents, reactions electronic effects and their appliocations.
- The preparations and reactions of Acyclic, Alicyclic and aromatic compounds.

Unit I:

(P-BLOCK ELEMENTS) – 15 hrs

General characteristics of elements of groups 13, 14, 15 elements.

Group-13: Synthesis and structure of diborane and higher boranes (B4H10 and B4H9),

Boran-Nitrogen compounds ($B_3N_3H_6$ and BN)

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

Group-15: Preparation and reactions of hydrazine, hydroxylamine

UNIT II:

1) P-BLOCK ELEMENTS – 8 hrs

1. General Characteristics of elements of group 16 and 17

Group 16: Classification of oxides based on Chemical behaviour and oxygen Content. Group 17: Inter halogen compounds and pseudo halogen compounds.

2. Organometallic compounds 8 hrs

Definition and classification of organometallic compounds, nomenclature, preparation,

properties and applications of alkyl of Li, Mg and Al

ORGANIC CHEMISTRY

UNIT-III 10 hrs

Structural theory of Organic chemistry

Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radical reagents. Bond polarization: Introduction of covalent bonds, electronegativity, inductive effect. Application of inductiveeffect (a) Basicity of amines (b) Acidity of carboxylic acids. Resonance of Mesomeric effects application to (a) acidity of phenol (b) acidity of carboxylic acids. Hyper conjugation and application to stability of carbonium ions, free radicals

Types of organic reactions: Addition - electrophillic, nucleophilic and free radicals Elimination-Examples (mechanism not required)

UNIT-IV **10 hrs**

1. ACYCLIC HYDROCARBONS **6 hrs**

Alkenes –preparation of alkenes(two methods), Additions of halogen and its mechanism.

Addition of HX. Markonikovs rule,addition of H2O, HOX with mechanism. Addition of HBr in the presence of peroxide (anti-markonikovs rule). Dienes-types of dienes, reactions of conjugated dienes _1,2 and 1,4 addition of HBr to 1,3 butadiene and Diels Alder reactions.

2. ALICYCLIC HYDROCARBONS **4 hrs**

Alkynes - Preperation by dehydrogenation of dihalides, dehalogenation of tetrahalidrs,

Properties-reactivity of cyclopropane and cyclobutane. Stability ofcycloalkanes - Baeyers strain theory, Sache and Mohr predictions and Conformations structures of cyclobutane, cyclopropane, cyclohexane.

UNIT-V

BENZENE AND ITS REACTIVITY **10 hrs**

Concept of resonance energy .Heat of hydrogenation, heat of combustion of Benzene,mention of C-C bond length and orbital picture of Benzene Concept of aromaticity-aromaticity definition,nHuckles rule –application to Benzanoid (Benzene Napthalene) and Non-Benzenoid compounds (cyclopropenylcation, cyclopentadieny anion and tropylium cation)

I. Reactions – General mechanism of electrophilic substitution, mechanism of nitration. Friedel crafts alkylation. Orientation of aromatic substitution definition of ortho,para and meta directing groups. Ring activating and deactivating groups with examples (Electronic and interpretation of various groups like NO and phenolic) Orientation effect of 1) Amino, methoxy and methyl groups 2) Carboxy , nitro ,nitrile carbonyl and Sulphonic acid groups 3) Halogenes.

SEMISTER -1

MODEL QUESTION PAPER

INORGANIC AND ORGANIC CHEMISTRY - CBCHE101

Duration:3 hrs **Max.Mark:75M** **Pass Min:30 M**

PART-A

Answer any Five of the following questions. Each carries 5 marks (5X5=25M)

1. Discuss the structure of $B_3N_3H_6$.
2. Write short notes on pseudohalogens.
3. How do you classify organo metallic compounds on basis of metal-carbon bond.
4. Explain acidic character of phenol.
5. Explain Hyper conjugation with example.
6. What is Diel's-Alder reaction? Give examples.
7. Write any two methods for the preparation of cycloalkanes.
8. Nitro group in Benzene is metadirecting. Explain.

PART-B

Answer all the questions. Each question carries 10 marks (5X10=50M)

9. a) Explain structure of Diborane.

(OR)

(b) Give any four applications of silicones and Write the reactions of Hydroxylamine.

10 a) what are oxides? Classify the oxides based on (i) Chemical behavior (ii) Oxygen content.

(OR)

b) Describe the preparation of organo lithium compounds. Name any four of its applications.

11 a) What is meant by inductive effect? Explain its applications.

(OR)

b) What are substitution reactions? Explain about nucleophilic substitution reactions with suitable examples.

12 a) What is Markonikov's rule? Explain the addition of H_2O and HOX with mechanism.

(OR)

b) What are cycloalkanes? Explain the stability of cycloalkanes by Baeyer's Strain theory.

13 a) Explain the Huckel's concept of aromaticity with examples.

(OR)

b) Discuss the mechanism of a) Nitration b) Halogenation of benzene.

QUESTION BANK

INORGANIC AND ORGANIC CHEMISTRY - CBCHE101

UNIT- 1

5M

1. Discuss the structure of Diborane.
2. Compare the structure of Borazole with benzene.
3. Discuss the structure of Boran Nitride.
4. Preparations and properties of Hydrazine
5. Write the preparations and properties of Hydroxylamine.

10M

Preparations, Classification and applications of Silicones.
Discuss the structure and preparation of Diborane.
Discuss the structure of boron nitride and borazole.
Write the preparation and properties of boron nitride and borazole.
Write the preparation and properties of hydrazine and hydroxyl amine.

UNIT-2

5M

1. Write shorts notes on Pseudo halogens.
2. Write briefly about Inter halogen compounds.
3. Classification of organo metallic compounds based on metal carbon bonds.
4. Classification of oxides based on chemical behaviour.
5. Classification of oxides based on oxygen content.
6. Synthetic applications of organo aluminium compounds.

10M

1. Classification of oxides based on chemical behaviour and oxygen content.
2. Write the Preparations and synthetic applications of organo lithium compounds.
3. Discuss the Preparations and synthetic applications of Grignard reagent.
4. Write the Preparations and synthetic applications of organo aluminium compounds.
5. Write the preparation of organo metallic compounds of Li, Mg and Al.

UNIT-3

5M

1. Write different types of bond fission.
2. Discuss various types of organic reagents.
3. Discuss the basicity of amines by inductive effect.
4. Discuss the acidity of phenols by mesomeric effect.
5. Explain the stability of carbocations.
6. Explain the acidity of carboxylic acids.
7. Explain the stability of carbon free radicals.

10M

1. Explain inductive effect and write its applications.
2. Explain mesomeric effect and its applications.
3. Explain hyperconjugation and write its applications.
4. Discuss various types of organic reactions.
5. Discuss the relative stability of carbocations and free radicals by using hyperconjugation.

UNIT-4

5M

1. Discuss the mechanism for the halogenation of alkenes.
2. Discuss the mechanism for addition of HX to alkenes.
3. Write the preparation and properties of alkynes.
4. Discuss various types of dienes.
5. Explain the acidic nature of alkynes.
6. Give the preparation of cycloalkanes by Freund's method.
7. Discuss anti Markownikoff's rule with example.
8. Write the Diels Alder reaction.

10M

1. Explain Markonikov's rule with mechanism.
2. Discuss the stability of cycloalkanes by Baeyer's strain theory.
3. Explain 1,2 and 1,4 addition of HBr to 1,3-butadiene.
4. Discuss the properties of cyclopropane and cyclobutane.
5. Write the reactions for the electrophilic addition of X2, HX and H2O to alkynes.
6. Discuss the stability of cycloalkanes by Sachse and Mohr theory.

UNIT-5

5M

1. Give the mechanism for nitration of benzene.
2. Give the mechanism for Friedel Crafts alkylation of benzene.
3. Give the mechanism for Friedel Crafts acylation of benzene.
4. Explain electrophilic substitution in monosubstituted benzenes.
5. What are activating groups and give examples.
6. What are deactivating groups and give examples.

10M

1. Explain the Structure of Benzene.
2. Explain Huckel's rule and its application to Benzenoid compounds.
3. Discuss the aromaticity of non benzenoid compounds.
4. Give the mechanism for Friedel Crafts acylation and alkylation of benzene.
5. Discuss the electrophilic substitution reactions in benzene.

Practical -I
Simple Salt Analysis
Paper Code- CBCHE101P

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

Anions:

1. Carbonate. 2. Sulphate 3. Chloride 4. Bromide 5. Acitate 6. Nitrate 7. Borate 8. Phosphate

Cations :

1. Lead 2. Copper 3. Iron 4. Allumimum 5. Zinc 6. Mangenes 7. Nickel 8. Calcium 9. Strantium 10. Barium 11. Potassium 12. Ammonium

KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)
Department of Chemistry

Class:	Semester:	Title of The Paper:	Paper Code:	W.E.F
IBSC (CBZ, MPC, MCCS)	II	PHYSICAL AND GENERAL CHEMISTRY	CBCHE201	2018-19

Syllabus

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		CIA	SEE	
60 Hours	4	3	3 Hours	25	75	

Course Objectives: The objective of this paper is to bring awareness among students on the principles of physical chemistry and stereochemistry of organic compounds.

Course Outcomes:

The student will gain an understanding of

- The symmetry properties in crystal structure and Brags equation.
- The gas laws and Joule Thomson effect.
- The classification and applications of liquid crystals.
- The valence bond theory and MO theory.
- The stereochemistry of organic compounds.

PHYSICAL CHEMISTRY

UNIT 1

SOLID STATE **8 HRS**

Symmetry in crystals. Law of constancy of interfacial angels. The law of rationality of indices. The law of symmetry. Definition of lattice point, space lattice, unit cell. X-ray diffraction and crystal structure. Braggs law. Determination of crystal structure by Braggs method. Defects in crystals-Stoichiometric and non-stoichiometric defects

UNIT 2

1. GASEOUS STATE **7 HRS**

Critical phenomena. The vander wall's equation and the critical state. Law of corresponding states. Relationship between critical constants and Vander Wall's constants. Joule Thomson effect.

2. LIQUID STATE **8 HRS**

Intermolecular forces, structure of liquids (qualitative description). Structural differences between solids liquids and gases. Liquid crystals, the mesomorphic state. Classification of liquid crystals into smetic and Nematic and Cholestic. Differences between liquid crystal and solid/liquid. Applications of liquid crystals as LCD devices

UNIT-3

SOLUTIONS **7 HRS**

Liquid-liquid–ideal solutions, Raoults law. Ideally dilute solutions, Henrys law. Azeotropes-HCl-H_2O, Ethanol-water systems. Partially miscible liquids – phenol water, trimethylamine-water, and nicotine –water system. Immiscible liquids and steam distillation. Nernst distribution law. Applications of distribution law.

GENERAL CHEMISTRY

UNIT-4

1. SURFACE CHEMISTRY **5 HRS**

Definition of colloids. Properties-Kinetic, optical, electrical. Stability of colloids, Hardy-Schulze law, protective colloid.

2. CHEMICAL BONDING **10 HRS**

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 hetro-nuclear diatomic molecules (N_2,O_2,CO and NO).

UNIT-5

STEREOCHEMISTRY OF CARBON COMPOUNDS **15HRS**

Molecular representation-Wedge, Fischer, Newmann and Saw-Horse formulae.

Optical isomerism: Optical activity-wave nature of light, plane polarised light, Optical rotation and specific rotation. Chiral molecules-definition, Definition of enantiomers and diastereomers-explanation of optical isomerism with examples Glyceraldehyde, Lactic acid and Tartaric acid.

D,L and R,S configuration methods (Cahn-Ingold-prelog rules) and E,Z-configuration.

SEMISTER-2

MODEL QUESTION PAPER

PHYSICAL AND GENERAL CHEMISTRY - CBCHE201

Duration: 3hrs **Max.mark:75M** **Pass min: 30M**

PART-A

Answer any Five of the following questions. Each Question carries five marks. (5X5=25M)

1. Define the terms space lattice and unit cell.
2. Write the structural differences between solids, liquids, gases.
3. Write the applications of liquid crystals.
4. State Henry's law. Write its limitations.
5. Write any five differences between VB theory and MO theory.
6. Write a short note on $Ni(CO)_4$.
7. Explain enantiomers and diastereomers with example.
8. Write a short note on E-Z configuration.

PART-B

Answer all the questions. Each question carries 10 marks. (5X10=50M)

9. Give an account of Bragg's method for the determination of the structure of crystals by means of X-rays.

(OR)

10. (a) Explain Frenkel and Schottkey defects in crystals. (b) Explain axis of symmetry in crystals.

11. Explain relationship between critical constants and Vander Wall's constants.

(OR)

12. What are liquid crystals? Write the classification of liquid crystals.

13. What are azeotropes and explain the types of Azeotropes.

(OR)

14. Explain Nernst distribution law. Give any three applications of distribution law.

15. Explain the following properties of colloids. a) Brownian moment b)Tyndall effect

(OR)

16. Explain molecular orbital (M.O) theory. Draw M.O diagram for CO.

17. Explain cahn-ingold-prelog rules for R,S configuration. (OR)

18. State and explain optical isomerism. Write the optical isomerism in lactic acid and tartaric acid.

II B.Sc – II SEMESTER - PHYSICAL AND GENERAL CHEMISTRY

Paper Code: CBCHE201

QUESTIONS BANK

UNIT- 1

5M

1. Define law of constancy of interfacial angles.
2. Write the Law of rationality of indices.
3. Define lattice point.
4. Write Bragg's equation and explain terms used in Bragg's equation.
5. Define space lattice, unit cell.

10M

1. Derive Bragg's equation.
2. Define lattice point, space lattice, unit cell.
3. Explain stoichiometric defect in crystal structure.
4. Explain non stoichiometric defect in crystal structure.
5. Explain laws of symmetry in crystals.

UNIT-2

5M

1. Write the differences between solids, liquids and gases.
2. Define critical constants.
3. Explain law of corresponding states.
4. Explain Joule Thomson effect.
5. Write the applications of liquid crystals.

10M

1. Write an essay on the Classification of liquid crystals.
2. Derive Vander Waal's equation.
3. Write the relationship between Critical constants and Vander walls constants.
4. Explain Linde's method for the liquification of gases.

UNIT-3

5M

1. Define Henry's law and write its limitations.
2. Explain negative deviations of Raoult's for Water-HCl system.
3. Explain positive deviations from Raoult's for ethyl alcohol-water system.
4. Define Azeotropic mixtures.
5. Write the applications of Nernst distribution Law.

10M

1. Define Critical solution temperature and explain the CST of Phenol –water system and trimethyl amine water system.

2. Explain Steam Distillation in the separation of immiscible liquids.

3. Derive Nernst Distribution law and write its applications.

4. Explain Roult's law and deviations from Raoult's law.

5. Write an essay on azeotropes and types of azeotropes.

UNIT-4

1. Explain Valence bond theory and its applications to ClF_3, $Ni(CO)_4$

2. Explain Hybridization.

3. Explain Valence bond theory and its applications to $Ni(CO)_4$

5. Differentiate between VB theory and MO theory.

6. Define Tyndall effect.

7. Define Brownian movement.

8. Write the Hardy schulze rule.

10M

1. Draw the MO diagrams for N_2, O_2 molecules.

2. Draw the MO diagrams for CO, NO molecules.

3. Explain Molecular Orbital theory by using LCAO method.

4. Explain Tyndall effect and Brownian movement.

5. Explain the electrical properties of colloids

UNIT-5

5M

1. Explain optical isomerism in lactic acid

2. Define the following

a) Optical activity b) Asymmetric or chiral carbon

3. Explain optical isomerism in glyceraldehyde

4. Define the following

a) Plane polarised light b) Specific rotation

5. Explain optical isomerism in Tartaric acid.

10M

1. Define Geometrical isomerism and explain E-Z configuration with examples.

2. Explain optical isomerism in lactic acid, glyceraldehyde, Tartaric acid.

3. Write the cahn-Ingold-Prelog rules for R-S configuration.

4. Define enantiomers and Diastereomers with examples.

5. Define the following

a) Optical activity b) Asymmetric or chiral carbon

c) Plane polarised light d) Specific rotation

Practical -II
Analysis of Salt Mixture
Paper Code- CBCHE201P

Analysis of minimum 6 MIXTURES containing 2 anions and 2 cations.(from two different groups) from the following (3hrs/w)

Anions:

1. Carbonate. 2. Sulphate 3. Chloride 4. Bromide 5. Acitate 6. Nitrate 7. Borate 8. Phosphate

Cations :

1. Lead 2. Copper 3. Iron 4. Allumimum 5. Zinc 6. Mangenes 7. Nickel 8. Calcium 9. Strantium 10. Barium 11. Potassium 12. Ammonium

KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)
Department of Chemistry

Class:	Semester:	Title of The Paper:	Paper Code:	W.E.F
IIBSC (CBZ, MPC, MCCS)	III	INORGANIC AND ORGANIC CHEMISTRY	CBCHE301A	2019-20

Syllabus

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory	Practical	3 Hours	CIA	SEE	
	4	3		25	75	

Course Objectives:

The objective of this paper is to bring awareness among students on the general characteristics and properties of d and f block elements and reaction mechanisms of various organic named reactions.

Course Outcomes:

The student will gain an understanding of

- The periodic properties, magnetic properties, catalytic properties of d and f block elements.
- The theories of bonding in metals.
- The preparation and properties of alkyl halides, alcohols, carbonyl compounds, carboxylic acids and their derivatives.

SEMESTER-III

INORGANIC AND ORGANIC CHEMISTRY - CBCHE301A **60 HRS (4 H/W)**

INORGANIC CHEMISTRY **30 Hrs**

UNIT-I

1. CHEMISTRY OF d-BLOCK ELEMENTS: **8 hrs**

Characteristics of d-block elements with special reference to electronic configuration, variable valence, magnetic properties, catalytic properties and ability to form complexes. stability of various oxidation states

2. THEORIES OF BONDING IN METALS: **7 hrs**

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. Metals carbonyls: **8 hrs**

EAN rule, classification of metals carbonyls, structure and shape of metal carbonyls of Mn, Fe and Ni.

2. CHEMISTRY OF F-BLOCK ELEMETS: **7hrs**

Chemistry of lanthanides-electronic configuration, oxidation states, lanthanide contraction, causes and consequences of lanthanide contraction. Chemistry of actinides – electronic configuration, comparison of lanthanides and actinides.

ORGANIC CHEMISTRY **30 hrs**

UNIT-III **10 hrs**

1. HALOGEN COMPOUNDS:

Nucleophilic aliphatic substitution reaction –classification into S_N1 and S_N2-reaction mechanism with examples. Stereo chemistry of S_N2 (walden in version) and S_N1 (Racemisation).

2. HYDROXY COMPOUNDS:

Alcohols: preparation with hydroboration reaction.

Phenols: preparation i) diazonium salt, ii) from aryl sulphonates, iii) from cumene.

CHEMICAL PROPERTIES:

a) dehydration of alcohols

b) oxidation of alcohols byCrO_3,$KMnO_4$.

c) special reactions of phenols: bromination, Kolbe-schmidt, Riemer-Tiemann reaction, pinacole-pinacolone rearrangement.

UNIT-IV

1. CARBONYL COMPOUNDS: **10 hrs**

Synthesis of aldehydes from acid chlorides,synthesis of ketones from nitriles and from carboxylic acids.

CHEMICAL PROPERTIES:

Nucleophilic addition reactions with a) $NaHSO_3$, b) HCN, C) RMgX, D) 2,4 DNPH

BASE CATALYSED REACTIONS: A) Aldol condensation, b) Cannizzro's reaction, c) Perkin reaction, d) benzoin condensation, e) halo form reaction, f) Knoevenagel reaction.

OXIDATION OF ALDEHYDES-Baeyer-villiger oxidation ketones.

REDUCTION: Wolf-Kishner reduction, MPV reduction ,reduction with $LiALH_4$ and $NaBH_4$.

2. CARBOXYLIC ACIDS AND DERIVATIVES

Methods of preparation by a) hydrolysis of nitriles, amides b) hydrolysis of esters.

PHYSICAL PROPERTIES: Acidity-strength of acids with examples of trimethyl acetic acid and trichloroacetic acid.

CHEMICAL PROPERTIES: Esterification (mechanism). degradation of carboxylic acids by Huns-Diecker reaction, decarboxylation by Schimdt reaction, halogenation by Hell-Volhard-Zelinsky reaction.

3. INTRODUCTION OF GREEN CHEMISTRY-Definition, need of Green chemistry, basic principles of green chemistry, atom economic reactions (rearrangement reactions)-claisen rearrangement, Fries Rearrangement, applications.

UNIT-V

ACTIVE METHYLENE COMPOUNDS: **10 hrs**

Keto-enol tautomerism, Acetoacetic ester: Preparation by Claisen condensation.

Synthetic applications: Preparations of

a) monocarboxylic acids-propionic acids and n-butyric acid.

b) dicorboxylic acids-succinic acid and adipic acid c) reaction with urea.

Malonic ester: preparation from acetic acid.

SYNTHETIC APPLICATIONS: Preparation of

a) monocarboxylic acid(propionic acid n-butyric acid).

b) Dicarboxylic acids(succinic acid and adipic acid).

c) α,β-unsaturated carboxylic acids (crotonic acid).

d) reaction with urea.

LIST OF REFERENCE 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 Bahll and Arun Bahl
4. A text book of organic Chemistry by I L Finar Vol 1
5. Organic chemistry by Brucie
6. Organic chemistry by Clayden
7. Advanced inorganic chemistry by Gurodeep Raj
8. Basic inorganic chemistry by Cotton and Willkinson
9. Concise inorganic chemistry by J.D..LEE

SEMISTER-3

MODEL QUESTION PAPER

INORGANIC AND ORGANIC CHEMISTRY - CBCHE301A

DURATION: 3 hrs **Max.mark: 75M** **Pass.min: 30M**

Part-A

Answer any five of the following questions. Each question carries five marks (5x5=25M)

1. Explain the magnetic behaviour of d-block elements.
2. State and explain EAN rule with examples.
3. Write a short notes on free electron theory.
4. Write the comparisons of lanthanoides and actinoids.
5. Explain pinacol-pinacolone rearrangement.
6. Define green chemistry.
7. Discuss the acidic strength of carboxylic acids.
8. Write a short notes on kete-enaol-tautamerism in aceto acetic ester.

PART-B

ANSWER ALL THE QUESTIONS.EACH CARRIES 10 MARKS (5X10=50M)

9. a) Write an essay on variable oxidation states and complex forming ability of d-block elements.

(OR)

(b) Explain the metallic properties by band theory.

10. (a) What are metal carbonyls? Discus the structures of $Ni(CO)_4$ and $Fe(CO)_5$.

(OR)

(b) What is lanthanide contraction? Write its consequences.

11. (a) Explain the mechanism of SN1 and SN2 reactions with suitable examples.

(OR)

(b) Write any two methods for preparation of phenols and Riemer-Tiemann reaction .

12. (a) write the following reactions 1) Perkin reaction 2) Cannizaro reaction.

(OR)

(b) Write the 12 principles of Green Chemistry.

13. (a)write the preparation of aceto acetic ester. How do you prepare succinic acid from aceto acetic ester.

(OR)

(b) Write the preparation of malonic ester.how do you prepare crotonic acid from malonic ester.

QUESTION BANK

INORGANIC AND ORGANIC CHEMISTRY – CBCHE301A

UNIT- 1

5M

1. Transition metals show variable oxidation states why.
2. Write the electronic configuration of 3d-series elements.
3. What are transition elements. Explain their special properties of catalytic nature and complex formation.
4. Discuss the following properties of d-block elements.

a) Complex formation b) magnetic properties

5. Explain free electron theory
6. Write a short note on semi conductors.

10M

1. How do you explain the properties of conductors, insulators and semiconductors by using band theory?
2. How does valance bond theory explain metal properties? Mention it limitations.
3. Explain the postulates of free electron theory .How does it explain the thermal and electrical conductivity of metals.
4. Discuss the magnetic and catalytic properties of transition elements.
5. Discuss the stability of various oxidation states of d-block elements.

UNIT-2

5M

1. write a note on EAN rule.
2. Explain the structure of $Ni(CO)_4$.
3. Explain the structure of Fe(CO)5.
4. Write the difference between lanthanides and actinides.
5. All lanthanides ions exhibit +3 oxidation states. Explain

10M

1. What are inner transitions elements? Explain their oxidation states and magnetic properties.
2. What is lanthanide contraction? Write about its consequences.
3. Give the Structure of metal carbonyls of Mn, Fe and Ni.

ORGANIC CHEMISTRY

UNIT-III

5M

1. Explain the mechanism of Reimer-Tiemann reaction.
2. Explain Kolbe Schmidt reaction.
3. Write a note on pinacol-pinacolone rearrangement.
4. Give the products on dehydration of alcohols.
5. Give the preparation of alcohols by hydroboration.
6. write the reactions for the oxidation of alcohol by CrO_3, $KMnO_4$.

10M

1. Write the difference between S_N1 and S_N2 reactions

2. Define nucleophilic substitution reactions? Explain the mechanism of S_N1 reaction with examples.

3. Explain the mechanism of S_N2 reaction with examples.

4. Explain the mechanism and stereo chemistry of S_N2 reaction.

5. Explain preparation of alcohols by hydroboration method

6. Write the preparation of phenols.

UNIT-IV

5M

1. Explain mechanism of aldol condensation.
2. Explain the mechanism of Cannizaro reaction.
3. Explain the mechanism of perkin condensation.
4. Write the mechanism of benzoin condensation.
5. Write a note on Haloform reaction.
6. Write a note on Knoevenagel condensation.
7. Explain atom economic reactions.

10M

1. How aldehydes and ketones are synthesized from

a) acid chlorides b) nitriles c) carboxylic acids

2. Explain aldol condensation, canizaro reaction

3. Write a short on a) Perkin reaction b) benzoin condensation

4. Write a short on the following

a) halo form reaction b) knoevenagel reaction

5. Explain a) Bayer-villiger oxidation and Wolf-Kishner reduction of ketones.

6. Write a short note on MPV reduction and reduction with $LiAlH_4$ and $NaBH_4$ of ketones.

7. How aldehydes and ketones are differentiated

8. write the 12 principles of Green chemistry.

UNIT-V

5M

1. Discuss the acidic nature of aceto acetic ester.
2. Explain Keto - enol tautomerism.
3. Write the mechanism of claisen ester condensation.
4. Write the preparation of carboxylic acids from aceto acetic ester.
5. Write the reaction of aceto acetic ester with urea.

10M

1. Give the synthetic application of Aceto acetic ester.
2. Give the synthetic application of malonic ester
3. How propionic acid and adipic acid, crotonic acid and urea are prepared from aceto acetic ester.
4. How propionic acid and adipic acid, crotonic acid and urea are prepared from malonic ester.
5. Write the synthesis of malonic and aceto acetic ester.

Practical -III
Titrimetric analysis and Organic Functional Group Reactions
Paper Code- CBCHE301AP

Titrimetric analysis: **25M**

1. Determination of Fe (II) using $KMnO_4$ with oxalic acid as primary standard.

2. Determination of Cu(II) using $Na_2S_2O_3$ with $K_2Cr_2O_7$ as primary standard.

Organic Functional Group Reactions: **25M**

3. Reactions of the following functional groups present in organic compounds (at least four) Alcohols, Phenols, Aldehydes, Ketones, Carboxylic acids and Amides.

KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)
Department of Chemistry

Class:	Semester:	Title of The Paper:	Paper Code:	W.E.F
IIBSC (CBZ, MPC, MCCS)	IV	SPECTROSCOPY AND PHYSICAL CHEMISTRY	CBCHE401A	2019-20

Syllabus

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		CIA	SEE	
60 Hours	4	3	3 Hours	25	75	

Course Objectives:

The objective of this paper is to bring awareness among students on the general principles and applications of spectroscopy and physical chemistry.

Course Outcomes:

The student will gain an understanding of

- Various spectroscopic methods and their applications
- Colligative properties and molecular weight determination.
- EMF and Applications of EMF measurements
- Application of phase rule to one and two component systems.

SPECTROSCOPY **60 HRS (4 h/w)**

UNIT-1:

SPECROPHOTOMETRY **8 Hrs**

General features of absorption-Beer-Lamberts law and its limitations, transmittance, Absorbance, and molar absorptivity. Single and double beam spectrophotometers. Applications of Beer-Lambert law for quanitative analysis of 1.chromium in $K_2Cr_2O_7$, Manganese in Manganous sulphate.

MOLECULAR SPECTROSCOPY: **7 Hrs**

Types of molecular spectra, Types of electronic transitions in molecules, effect of conjugation, Concept of chromophore and auxochrome.

UNIT-2

INFRARED SPECTROSCOPY **7 Hrs**

Different Regions in Infrared radiations. Normal Modes of vibrations in diatomic and polyatomic molecules. Characteristic absorption bands of various function groups - Alkanes, alkenes, Alcohols carbonyls and carboxylic acids with one example each, Applications of IR spectroscopy.

PROTON MAGNETIC RESONANCE SPECTROSCOPY (1H-NMR) **8 Hrs**

Principle of nuclear magnetic resonance, equivalent and non-equivalent protons,

Chemical shift, NMR splitting of signals in propane, ethyl bromide, , acetaldehyde, acetone, toluene and acetophenone, spin-spin coupling, Applications of NMR.

PHYSICAL CHEMISTRY **30 Hrs**

UNIT-3 **10 Hrs**

DILUTE SOLUTIONS: Colligatives properties. Raoults law, relative lowering of vapour pressure, its relation to molecular weight of non-volatile solute. Elevation of boiling point and depression of freezing point. Derivation of Relation between molecular weight and elevation of boilig point and depression in freezing point. Osmosis ,osmotic pressure, Determination of molecular weight of non-volatile solute from osmotic pressure. Abnormal colligative properties-Vant Hoff factor.

UNIT-4 **10 Hrs**

ELECTROCHEMISTRY

Migration of ions, Kohlrauschs law Debye-Huckel-Onsagars equation for strong electrolytes (elementary tratement only). Definition of transport number, determination by Hittorfs method. conductometeric titrations, Single electrode potential, Nernst Equation, Reference electrodes-Standard Hydrogen electrode and calomel electrode, EMF and measurement of EMF.

UNIT-5 **10 Hrs**

PHASE RULE

Concept of phase, component, degree of freedom. Statement and limitations of Phase rule, Phase diagram for one component system-water system, Reduced or condensed phase rule-Simple eutectic diagram of Pb-Ag system, Pattinsons process of desilverisation of lead, NaCl-Water systems, freezing Mixtures.

II B.Sc – IV SEMESTER - SPECTROSCOPY AND PHYSICAL CHEMISTRY

Paper Code: CBCHE401A w.e.f-2019-20

MODEL QUESTION PAPER

DURATION:3 HRS **Max.mark: 75 M** **Pass min: 30 M**

PART-A

ANSWER ANY FIVE OF THE FOLLOWING. **EACH CARRIES 5 MARKS**

1. What are Freezing mixtures.
2. Explain the terms present in phase rule.
3. Write a short notes on calomel electrode.
4. Explain kohlraush law.
5. Write a short note on effect of conjugation on UV spectrum
6. Write the characteristic IR absorption bands in alkanes.
7. Discuss about single and double beam spectrophotometers
8. Write a short note on equivalent and non equivalent protons.

PART-B

ANSWER ALL THE QUESTIONS. **EACH CARRIES 10 MARKS**

10. A) what is phase rule? Explain the phase diagram of water system.

(OR)

B) Explain the phase diagram of two component system of pb-Ag system.

11. a) What is transport number? How do you determine transport number by Hittorf's method.

(OR)

b) Explain Various types of conductometric titrations.

12. A) Determination the molecular weight of non volatile solute from osmotic pressure.

(OR)

B) Derive the relation between molecular weight and elevation of boiling point.

13. a) State and explain beer-lambert's law. Explain application of beer-lambert law for conquitative
analysis of chromium in potassium dichromate.

(OR)

b) Explain the terms chromophore and auxochrome.

14. a) Explain normal modes of vibrations in di and tri atomic molecules.

(OR)

b) Explain the following terms with examples 1) chemical shift 2) spin-spin coupling.

II B.Sc – IV SEMESTER - SPECTROSCOPY AND PHYSICAL CHEMISTRY

Paper Code: CBCHE401A w.e.f-2019-20

QUESTION BANK

UNIT-1

5M

1. Write the types of electronic transitions.
2. Define chromophore and auxochrome.
3. Explain effect of conjugation on UV absorption.
4. What is molar absorptivity?
5. What is absorbance and transmittance? Explain

10M

1. What are single beam and double beam spectrothotometers? Explain briefly.
2. State and explain Beer - Lamberts law and write its limitations.
3. Write about the application of beer Lamberts law for quantitave analysis of Chromium in potassium dichromate.
4. Write about the application of Beer Lamberts law for Quantitave analysis of Manganese in Manganous sulphate.
5. Discuss auxochromes and chromophores with suitable examples.

UNIT-II

5M

1. Write the characteristic IR absorption bands in alkanes.
2. Write the characteristic IR absorption bands in alcohols.
3. Write the characteristic IR absorption bands in carboxylic acids.
4. Write the characteristic IR absorption bands in alkenes.
5. Define Chemical Shift in NMR.
6. Give the NMR splitting of signals in ethyl bromide.
7. Give the NMR splitting of signals in acetaldehyde.

10M

1. Write about the normal modes of vibrations of atoms in polyatomic molecule
1. Give the characteristic absorption bands of alcohols, carbonyls and carboxylic acids.
3. Discuss different regions in IR.
4. Write the application of NMR.
5. Write the applications of IR Spectroscopy.

UNIT-III

PHYSICAL CHEMISTRY

5M

1. State Raoult's law. Give its limitations.
2. What are colligative properties.
3. Define van't Hoff factor.
4. Define elevation in boiling point.
5. Define depression in freezing point.
6. define osmotic pressure.

10M

1. Explain depression in freezing point and derive the expression to determine the molecular weight of a solute by using depression in freezing point.

2. Explain elevation of boiling point and derive the expression to determine the molecular weight of a non-volatile solute by using elevation of boiling point.

3. Explain relative lowering of vapour pressure and derive the expression to determine the molecular weight of a non-volatile solute by using relative lowering of vapour pressure.

4. Explain determination of molecular weight of non volatile solute from osmotic pressure.

5. Explain the abnormality in colligative properties and define Van't Hoff factor.

UNIT IV

5M

1. Define Single electrode potential.
2. Explain Kohlrausch's Law.
3. Define transport number.
4. Explain migration of ions.
5. Define reference electrode and give one example..

10M

1. What is transport Number? How it can be determined by Hittorf method?
2. What are conductometric titrations? Explain conductometric titrations of strong acid vs strong base.
3. Explain Debye-Huckel Onsagar theory of strong electrolytes.
4. Define and explain the Pogendroff's compensation method to measure the EMF.

5. Give the construction and working of standard hydrogen electrode.
6. Give the construction and working of Calomel electrode.

UNIT V

5M

1. Explain concept of phase.
2. Define degrees of freedom.
3. Write a short note on freezing mixture?
4. Define phase rule.
5. Define components of a system.
6. Explain the Pattinson's desilverisation of lead.

10M

1. Discuss the phase diagram of water system.
2. Explain the phase diagram of pb-Ag system.
3. Explain the phase diagram of NaCl-H2O system?
4. Define reduced phase rule and explain the process of desilverisation of lead.
5. Explain the term used in phase rule in detail.

Practical -IV
PHYSICAL CHEMISTRY AND IR SPECTRAL ANALYSIS

Code: CBCHE401AP

30 HRS (2 H / W) PHYSICAL CHEMISTRY **25 M**

1. Critical Solution Temperature- Phenol-Water system

2. Effect of NaCl on critical solution temperature (Phenol-Water system)

3. Determination of concentration of HCl conductometrically using standard NaOH solution.

4. Determination of concentration of acetic acid conductometrically using standard NaOH Solution.

5. Verification of Beer-Lambert's law

IR Spectral Analysis **25 M**

6. IR Spectral Analysis of the following functional groups with examples a) Hydroxyl groups

b) Carbonyl groups c) Amino groups

d) Aromatic groups

KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)
Department of Chemistry

Class:	Semester:	Title of The Paper:	Paper Code:	W.E.F
III BSC (CBZ, MPC, MCCS)	V	INORGANIC, PHYSICAL AND ORGANIC CHEMISTRY	CBCHE501	2017-18

Syllabus

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory	Practical	3 Hours	CIA	SEE	
	4	3		25	75	

Course objectives:

1. The graduate with chemistry as one of the subjects will have firm foundation in the fundamental and theoretical knowledge of metal complexes and bioinorganic chemistry and chemical kinetics and photo chemistry.

2. To get knowledge on coordination compounds and the theories related to coordination compounds.

Course Outcomes:

The student will gain an understanding of

- Coordination Compounds and their properties basing on VBT and Crystal field theory.
- Synthesis and reactions of nitro and amino compounds .
- Thermodynamic properties.

SEMESTER-V

PAPER-V

INORGANIC, PHYSICAL AND ORGANIC CHEMISTRY - CBCHE501 45H

INORGANIC CHEMISTRY

UNIT-I

COORDINATION CHEMISTRY: 8 hrs

IUPAC nomenclature, concept of coordination, valence bond theory, geometries of coordination number-4-tetrahedral and squareplaner, and 6-octahedral and its limitations. Crystal field theory-splitting of d-orbitals in octahedral, tetrahedral and square-planer complexes-low spin and high spin complexes. Factors affecting crystal field splitting energy. isomerism in coordination compounds-structural isomerism and stereo isomerism, stereo chemistry of complexes with 4 and 6 coordination numbers

UNIT-II

1. spectral and magnetic properties of metal complexes: 4hrs

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

2.satbility of metal complexes:

Factors affecting the stability of metal complexes, chelate affect, determination of composition of complex by job's method and mole ration method.

UNIT-III

ORGANIC CHEMISTRY

Nitro hydro carbons:

Nomenclature and classification-nitro hydro carbons, structure, preparation of nitro alkanes(vapour phase nitration of alkanes, from alkyl halides, from oximes), reactivity-halogenation, reaction with HONO(nitrous acid), Nef reaction and Mannich reaction leading to micheal addition and reduction.

UNIT-IV

NITROGEN COMPOUNDS:

Amines (aliphatic): Nomenclature, classification into primary, secondary, tertiary amines and quarternary ammonium compounds. Preparative methods- 1. gabriel synthesis

2. Hoffman's bromamide reaction (mechanisam).

Reduction of amides and Schmidt reaction.physical properties and basic character.

Chemical properties: a) Alkylation b) Acylation c) Carbylamine reaction d) Hinsberg separation e)reaction with nitrous acid of primary, secondary, tertirary (aliphatic amines).Diazotization.

UNIT-V

PHISICAL CHEMISTRY

Thermodynamics:

The first law of thermodynamics- statement, definition of internal energy and enthalpy. Heat capacities and their relationship.

Joule-Thomson effect-coefficient. State function. Temperature dependence of enthalpy of formation- Kirchoff s equation. Second law of thermodynamics Different Statements of the law. Caront cycle and its efficiency. Carnot theorem. Concept of entropy. entropy as a state function.

MODEL PAPER

INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY - CBCHE501

MAX.MARKS: 75 M

PART-A

ANSWER ANY FIVE OF THE FOLLOWING QUESTIONS EACH QUESTION CARRIES 5 MARKS

1. Explain the factors that effect the stability of complexes.
2. Write the IUPAC names of the following compounds.

i) $[Co(NH_3)_6]Cl_3$ ii) $K_4[Fe(CN)_6]$

3. Explain the postulates of valence bond theory.
4. Discuss Mannich reaction
5. How are primary, secondary and tertiary amines distinguished with nitrous acid.
6. Explain Schmidth reaction and diazotisation.
7. write a note on entropy.
8. Write a note on Joule Thomson co-efficient.

PART-B

ANSWER ALL THE QUEATIONS EACH CARRIES 10 MARKS 5X10=50M

9 (a). Explain different types of structural isomerism in coordination complexes.

(OR)

(b) Explain stereo isomerism in coordination complexes with coordination number 6.

10 (a) Explain the determination of composition of a complexes by jobs method.

(OR)

(b) Define Magnetic susceptibility and explain gouy's method.

11 (a) Write any three methods of preparation of nitro alkanes.

(OR)

(b) Explain the following reactions i) Nef reaction ii) reaction of nitrous acid with nitro alkanes.

12 (a) how do you separate primary, secondary and tertiary amines from a mixture by Hinsberg method.

(OR)

(b) Explain i) Gabriel synthesis ii) hofmann's Bromamide reaction.

13 (a) State Carnot's theorem and derive an expression for the efficiency of a reversible heat engine using Carnot cycle.

(OR)

(b) i) Derive Kirchoff's equation ii) State any two statements of second law of Thermodynamics.

Question Bank

Paper Code-CBCHE501

INORGANIC, PHYSICAL & ORGANIC CHEMISTRY

Unit I

5M

1. Explain the splitting of d orbitals in tetrahedral complexes.
2. Write the postulates of valence bond theory and its limitations.
3. Explain different types of structural isomerism exhibited by complexes with examples.
4. Explain the factors effecting crystal field splitting energy.
5. Write a note on low spin and high spin complexes.
6. Write the assumptions of crystal field theory.

10 M

1. Describe the splitting of d orbitals in tetrahedral and square planar complexes.
2. Write the assumptions of crystal field theory and explain the splitting of d-orbitals in octahedral complexes.
3. Explain the optical isomerism in tetrahedral and octahedral complexes.
4. Explain the geometrical isomerism in square planar and octahedral complexes.
5. Write the postulates of valence bond theory and explain the structure of $[Co(NH_3)_6]^{3+}$ according to Valence bond theory.

Unit II

5M

1. Calculate the magnetic momentum of Co in the complex $[Co(NH_3)_6]^{3+}$.
2. Explain the determination of composition of a complex by mole ratio method.
3. Explain chelate effect.
4. Write a note on Spin only formula.
5. Write a note on Para magnetism of substances.

10M

1. Define magnetic susceptibility. Explain Gouy's method of determination of magnetic moment of a compound.
2. Discuss various types of magnetic behaviour of substances.
3. Explain the determination of composition of a complex by Jobs method.
4. Explain factors effecting the stability of complexes.

Unit III

5M

1. Write a short note on halogenation of nitroalkanes.
2. Write the reaction of nitroalkanes with nitrous acid.
3. What is vapour phase nitration. Give one of its applications.
4. Write a short note on Nef reaction.
5. Write any two preparations of nitro alkanes.
6. Explain Michael addition reaction.

10M

1. Explain the following a) Nef reaction b) Mannich reaction
2. Write the preparation of nitro alkanes from vapour phase nitration of alkanes, alkyl halides and oximes.
3. Explain the reactions for reduction and halogenation of nitro alkanes.
4. Write methods of preparation of nitro alkanes.

UNIT IV

5M

1. Write carbyl amine reaction.
2. Explain Gabriel synthesis.
3. Explain Hoffmans-Bromamide reaction with mechanism.
4. Explain Schmidt reaction.
5. Write a short note on Diazotisation.

10 M

1. How can you distinguish primary, secondary and tertiary amines with nitruos acid
2. Explain a) Schmidt reaction b) Diazotisation.
3. Explain the basic character of amines.
4. Explain a) Gabriel synthesis b) Hoffmans-Bromamide reaction.
5. How do you separate primary,secondary and tertiary amines from a mixture by Hinsberg method.

UNIT V

5M

1. Write a note on Entropy.
2. State first law of thermodynamics.
3. State second law of thermodynamics.
4. Define Internal energy and Enthalpy.
5. Briefly describe Carnot's theorem.
6. What is a state function.

10M

1. Explain Joule-thomson effect.
2. Derive kirchoffs equation.
3. State carnot theorem. Derive an expression for the efficiency of a reversible heat engine using carnot's cycle .

4. Derive kirchoffs equation.
5. State any two ways of expressing the second law of thermodynamics.
6. State and Explain first and second law of thermodynamics.

Practical Paper–V

Paper Code: CBCHE501P

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

Organic Qualitative Analysis: 50M

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

KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)
Department of Chemistry

Class:	Semester:	Title of The Paper:	Paper Code:	W.E.F
III BSC (CBZ, MPC, MCCS)	V	INORGANIC, PHYSICAL AND ORGANIC CHEMISTRY	CBCHE502	2017-18

Syllabus

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory	Practical	3 Hours	CIA	SEE	
	4	3		25	75	

Course Objectives:

1. The graduate with chemistry as one of the subjects will have firm foundation in the fundamental and theoretical knowledge of metal complexes and bioinorganic chemistry and chemical kinetics and photo chemistry.

2. Have firm foundations in the fundamentals and theretical knowledge of heterocyclic compounds and carbohydrates and aminoacids and how they are related to chemical reactions taking place in human body and application to day to day life.

Course outcomes:

The student will gain an understanding of

- Reactivity of metal complexes and structure of some bio inorganic compounds like hemoglobin.
- Kinetics of chemical and photochemical reactions.
- Structure and reactivity of five membered heterocyclic compounds, carbohydrate and amino acids.

SEMESTER-V

Paper-VI

(INORGANIC, ORGANIC AND PHISICAL CHEMISTRY) - CBCHE502 45hrs(3 h/w)

INORGANIC CHEMISTRY

UNIT-I

1. Reactivity of metal complexes:

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

2. Bioinorganic chemistry:

Essential elements, biological significance of Na, K, Mg, Ca, Fe, Co, Cu, Cl. Metalloporphyrins- Structureand functions of hemogolobin, Myoglobin and Cholorophyll.

PHYSICAL CHEMISTRY

UNIT-II

1. Chemicak kinetics

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 determine the order of rection. Effect of temperature on rate reaction.

2. Photochemistry

Difference between thermal and photochemical process. Laws of photochemistry-Grothus Drapers law Stark-Einsteins law of photochemical equivalence. Quantum yield-Photochemical reactions mechanism-hydrogen-chlorine, hydrogen-bromine reaction. phosphorescence, Photosensitized reactions.

UNIT-III

ORGANIC CHEMISTRY

Heterocyclic Compounds

Introduction and definition: Simple five membered ring compounds with one hetero atom Ex: Furan. Thiophene and pyrole-Aromatic character-Preparation from1,4,-dicarbonyl compound, 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.

UNIT-IV

Carbohydrates

Monosaccharides (+) Gluscose (aldo hexose)-Evidence for cyclic structure of gluose (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 Manosccharides: Aldopentose to Aldohexose (Arabinose to D-Gluscose. D- Mannose) (Kiliani-Fischer method). Emiers, Epimerisation-Lobry debruyn van Ekenstein rearrangment. Aldopentose (D-Glucose to D-Arabinose)by Ruff degradation. Aldohexose to Ketohexose.

{(+)Glucose to (-)Fructose}and Ketohexose to Aldohexose (Fructose to Glucose).

UNIT-V

Amino acids and proteins

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 By following methods: a) from halogenated carboxylic acid (HVZ) b) Malonic ester synthesis c) streckers synthesis.

Physical properties: General reactions due to amino (Alkylation, Acylation with nitrous acid) and carboxyl groups (Esterification. Decarboxylation reaction, with ammonia)-lactams from gamma and delta amino acids by heating peptide bond(amide linkage).

MODEL PAPER PAPER-VI

INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY - CBCHE502

MAX.MARKS:75

PART-A

ANSWER ANY FIVE OF THE FOLLOWING QUESTIONS EACH CARRIES 5 MARKS (5X5=25)

1: Explain the biological significance of Mg and Cu.

2: Write a short note on phosphoroscene.

3: Write a any two electrophilic substitution reactions of pyrrole.

4: Define order and molecularity of a reaction . distinguish between them.

5: Explain the term muta rotation and describe the mechanism involved in it.

6: How do you convert glucose to fructose.

7: Explain zwitter ion and structure of amino acids.

8: Outline the synthesis of phenylalanine by strecker's synthesis.

PART-B

ANSWER ALL THE QUESTIONS EACH QUESTION CARRIES 10 MARKS (5X10=50M)

9 (a). Explain SN1 and SN2 reaction in co-ordination compounds

(OR)

(b) What is meant by metalloporphyrins? Explain the functions of haemoglobin and chlorophyll .

10 (a) Derive an expression for the rate constant of first order reaction.

(OR)

(b) State and explain law of photochemical equivalence and define quantum yield of a photochemical reaction.

11 (a) Write the electrophilic substitution reactions in furan and pyrrole.

(OR)

(b) Explain the aromaticity of furan, thiophene and pyrrole.

12 (a) What are monosaccharides? Describe the general properties of glucose and fructose. Write the mechanism for the formation of glucosazone.

(OR)

(b) Write the structural elucidation of glucose.

13 (a) Write the classification of amino acids based on the structure and nature?

(OR)

(b) Give any three methods for the preparation for amino acids.

QUESTIONS BANK

INORGANIC AND ORGANIC CHEMISTRY – CBCHE502

UNIT- 1

5M

1. Define labile and inert complexes.
2. Explain S_N1 reaction in square planar complexes.
3. Explain S_N2 reaction in square planar complexes.
4. Write a note on Trans effect.
5. Write the biological significance of Na, K and Mg.
6. Discuss the functions of haemoglobin..

10M

1. Discuss the structure and functions of haemoglobin.
2. Discuss the structure and functions of myoglobin.
3. Discuss the structure and functions of chlorophyll.
4. Explain trans effect and its applications..
5. Write the mechanism of S_N1 and S_N2 in square planar complexes..

UNIT-2

5M

1. Define order of the reaction..
2. Define molecularity of the reaction.
3. Write the differences between molecularity and order of the reaction..
4. Explain the effect of temperature on the rate of the reaction..
5. Define quantum yield.
6. Define fluorescence and phosphorescence.

10M

1. Derive rate constant for first order reaction.
2. Derive rate constant for Zero reaction.
3. Discuss the methods to determine the order of the reaction.
4. Write the laws of photochemistry.
5. Write the mechanism for the photochemical reaction between H_2 and Cl_2.
6. Write the mechanism for the photochemical reaction between H_2 and Br_2

UNIT-III

5M

1. Write the reactivity order of aromaticity of pyrrole, furan and thiophene.
2. Discuss the acidic character of pyrrole..
3. Write the Diels alder reaction in furan.
4. Write the preparation of furan from Paul knorr synthesis.
5. Discuss the nitration in furan, pyrrole and thiophene.

10M

1. Write the synthesis of Furan, pyrrole and thiophene by Paul Knorr synthesis.
2. Discuss the electrophilic substitution reactions in Furan.
3. Discuss the electrophilic substitution reactions in Pyrrole.
4. Discuss the electrophilic substitution reactions in thiophene.
5. Discuss the aromaticity of pyrrole, furan and thiophene.

UNIT-IV

5M

1. Write a note on Kiliani synthesis.
2. Write a note on Ruff Degradation.
3. Write the reaction of osazone formation in glucose.
4. Write the reaction of osazone formation in Fructose.
5. Write a note on Lobry debruyn Van ekenstein rearrangement
6. Define epimers and epimerisation.

10M

1. Discuss the structure of glucose.
2. Discuss the structural elucidation of fructose.
3. Write the reactions of conversion of glucose to fructose and fructose to glucose.
4. Write a note on Ruff Degradation and kiliani Synthesis.
5. Write the reaction of osazone formation in glucose and fructose.
6.

UNIT-V

5M

1. Define isoelectric point.
2. Define zwitter ion.
3. Define essential and non essential amino acids.
4. Write the preparation amino acids from HVZ reaction.
5. Write a note on strecker synthesis.

10M

1. Write the preparation of amino acids from 1. HVZ reaction 2. Malonic ester synthesis 3. Strecker synthesis.
2. Explain briefly about zwitter ion and isoelectric point.
3. Write the classification of amino acids.
4. Write the properties of amino acids due to amino group.
5. Write the properties of amino acids due to Carboxylic group

Practical-VI

Paper Code-CBCHE502P

Physical Chemistry **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.

KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)
Department of Chemistry

Class:	Semester:	Title of The Paper:	Paper Code:	W.E.F
III BSC (CBZ, MPC, MCCS)	VI	ENVIRONMENTAL CHEMISTRY	CBCHEB601	2017-18

Syllabus

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory	Practical	3 Hours	CIA	SEE	
	4	3		25	75	

OBJECTIVES:

- To develop an understanding of chemicals and their effects on the environment.
- To learn basic chemical content in context.

Course Outcomes:

The student will gain an understanding of

- Impact of air and water pollution and their controlling methods.
- How chemistry plays an important role in chemical toxicology.
- Knowledge of ecosystem and biodiversity.

SEMESTER-VI

ELECTIVE PAPER-VII(B) ENVIRONMENTAL CHEMISTRY 45HRS(3 h/W)

UNIT-I

INTRODUCTION: 9 hrs

Concept of environmental chemistry-Scope and important of environment in now a days-Nomenclature of environmental chemistry-Segments of environment-Solar and biomass energy and Nonrenewable resources-Thermal power and atomic energy reactions of atmospheric oxygen.

UNIT-II

AIR POLLUTION: 9 hrs

Definition-SOURCES OF AIR POLLUTION (i. Natural. ii. manamade. iii. Particulate matter (inorganic/organic))-Classification of air pollution-Acid rain-Photochemical smog-Green house effect-Formation and Depletion of ozone-Bhopal gas disaster-controlling method of air pollution.

UNIT-III

WATER POLLUTION: 9 hrs

Unique physical and chemical properties of water-water quality and criteria for finding of water quality-dissolved oxygen-BOD, COD, Hardness of water- methods to convert temporary hard water into soft water- methods to convert permanent hard water-eutrophication and its effects-principal wastage treatment- industrial waste water treatment.

UNIT-IV

CHEMICAL TOXICOLOGY 9 hrs

Toxic chemicals in the environment- effects of toxic chemicals-cynanide and its toxic effects-pesticides and its bio chemical effects-toxicity of lead, mercury, arsenic and cadmium.

UNIT-V

ECOSYSTEM AND BIO DIODIVERSITY ECOSYSTEM 9 hrs

Concepts-structure-functions and types of ecosystem- abiotic and biotic components-energy flow and energy dynamics of ecosystem-food chain-food web-tropic levels.

BIODIVERSITY

Definition-level and types of biodiversity-concept.

LIST OF DIFFERENCE BOOKS

1. Fundamentals of ecology by M. C. Dash.

2. A text book of environmental chemistry by W. Moore and F. A. Moore.

3. Environmental chemistry by Samir k. Banerji.

MODEL PAPER

PAPER-VII(B):ENVIRONMENTAL CHEMISTRY - CBCHEB601

TIME-3HRS MAX MARKS:75 PASS MARKS: 30

ANSWER ANY FIVE OF THE FOLLOWING QUESTIONS EACH CARRIES FIVE MARKS (5X5=25 M)

1. Explain the nomeclature of environmental chemistry.

2. What are the reactions of atmospheric oxygen.

3. Write a short note on controlling methods of Air pollution.

4. Explain the depletion of ozone layer.

5. Explain the following terms i) BOD ii) COD

6. Write a short note on Eutrophication.

7. Write the biochemical effect of mercury.

8. Give a detail note an Ecosystem.

ANSWER THE ALL QUESTIONSEACH CARRIES TEN MARKS. 5 x10=50M

9. a) Discuss the environmental segment in detail.

(OR)

b) What is renewable source of energy. Explain the following energies

1) Solar energy 2) biomass energy

10. a) What is Air pollution. Explain various sources of air pollution.

(OR)

b.) Explain the following

1. Acid rain 2) photochemical smog.

11. a) What is hardness of water? How permanent hard water convert into soft water

(OR)

b. Discuss the chemical methods of purification of waste water.

12. a. Discuss biochemical effect of the following substances

1) Pesticides 2) lead 3) cyanide.

(OR)

b. Explain the toxic effect of cadmium and arsenic

13. a. Explain types of ecosystem.

(OR)

b. What is biodiversity? Explain types of biodiversity.

DEPARTMENT OF CHEMISTRY

SUBJECT: ENVIRONMENTAL CHEMISTRY - CBCHEB601

QUESTION BANK

UNIT – I

5M

1. What is solar and biomass energy.
2. Write a short note on non renewable resources.
3. Write the nomenclature of environmental chemistry.
4. Write a note on thermal power and atomic energy.
5. Explain reactions of atmospheric oxygen?

10M

1. Discuss segments of environment?
2. What is the scope and importance of environment?
3. What is thermal power and atomic energy? Explain reactions of atmospheric oxygen?

Short Questions:

Unit – II

5M

1. What is acid rain?
2. Write a note on Bhopal Gas disaster.
3. Explain photochemical smog.
4. What is Green House effect.

10M

1. Explain classification of air pollution?
2. Write about green house effect?
3. Discuss about sources of air pollution?
4. Explain controlling methods of air pollution

Unit – III

5M

1. Explain Dissolved oxygen.
2. Write a note on unique physical and chemical properties of water.
3. Define BOD and COD.
4. What is hardness of water?
5. Write a note on industrial waste water treatment.

10M

1. What is hardness of water? Discuss the methods to convert temporary hard water into soft water and permanent hard water into soft water
2. Write about principle wastage treatment & industrial waste water treatment?
3. Explain water quality and criteria for finding of water quality.
4. Explain eutrophication and its effects.

Unit – IV

5M

1. Write the bio chemical effects of mercury?
2. What is toxicology? Write about toxic elements present in environment?
3. Write notes on Minamata disease.
4. Explain the toxic effects of Cyanide.
5. Explain the toxic effects of lead.

10M

1. Discuss the toxic effects of pesticides?
2. Explain the toxic effects of Cadmium and Arsenic?
3. Explain the toxic effects of Cyanide, Carbon monoxide?
4. explain the toxic effects of Pb and Hg.

Unit – V

5M

1. What is ecosystem? Write about its components?
2. What is food chain? Give one example
3. What is food web? Give an example.
4. Give the types of eco system.
5. What is biodiversity?

10M

1. Explain types of ecosystem?
2. What is biodiversity? Explain types of biodiversity
3. Explain about energy flow and energy dynamics of ecosystem.

Practical-VIIB

Paper Code-CBCHEB601P

PRACTICAL PAPER-ELECTIVE VIIB **Max Marks-50** **30hrs (2 h/W)**

1. Determination of carbonate and biocarbonate in water samples (acidity and alkalinity)
2. Determination of hardness of water using EDTA.

a) Permanent hardness b)Temporary hardness.

3. Determination of chlorides in water samples.

KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)
Department of Chemistry

Class:	Semester:	Title of The Paper:	Paper Code:	W.E.F
III BSC (CBZ, MPC, MCCS)	VI	ENVIRONMENTAL CHEMISTRY	CBCHEB602	2017-18

Syllabus

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory	Practical	3 Hours	CIA	SEE	
	4	3		25	75	

Course Objectives:

- To study various types of conventional and non-conventional energy resources including solid, liquid, and gaseous fuels.
- Knowledge on solid, liquid and gaseous fuels
- Knowledge on characterization of batteries

Course Outcomes:

The student will gain an understanding of

- Classification of fuels and their calorific values, importance and various processes for coal formation.
- Refining and different types of petroleum products and their applications.
- Principle and process of fractional distillation and its application to petrochemicals.
- Classification of lubricants and their determination.
- Different types of batteries and their role.

SEMESTER - VI

Cluster Elective –II

PAPER – VIII-B-1 : FUEL CHEMISTRY AND BATTERIES - CBCHEB602

45 hrs (3 h / w)

UNIT –I **12h**

Review of energy sources (renewable and non-renewable) – classification of fuels and their calorific value. Coal: Uses of Coal (fuel and non-fuel) in various industries, its composition, carbonization of coal - coal gas, producer gas and water gas – composition and uses – fractionation of coal tar – uses of coal tar based chemicals, requisites of a good metallurgical coke, coal gasification (Hydro gasification and catalytic gasification)

UNIT-II **6h**

Petroleum and petrol chemical industry:

Composition of crude petroleum, refining and different types of petroleum products and their applications.

UNIT-III **10h**

Fractional distillation (principle and process), cracking (Thermal and catalytic cracking). Reforming petroleum and non-petroleum fuels (LPG, CNG, LNG, biogas), fuels derived from biomass, fuel from waste, synthetic fuels (gaseous and liquids), clear fuels, petro chemicals: vinyl acetate, propylene oxide, isoprene, butadiene, toluene and its derivative xylene.

UNIT-IV **10h**

Lubricants: Classification of lubricants, lubricating oils (conducting and non- conducting), solid and semi-solid lubricants, synthetic lubricants. Properties of lubricants (viscosity index, cloud point, pore point) and their determination.

UNIT-V **7h**

Batteries:

Primary and secondary batteries, battery components and their role, Characteristics of Battery. Working of following batteries: Pb acid, Li-Battery, Solar cell and polymer cell.

MODEL PAPER

SECTION-A

Answer any FIVE of the following questions **5X5=25M**

1. Write short notes on calorific value.

2. Describe the production of producer gas. Mention its uses.

3. Explain Catalytic Gasification of Coal.

4. What is Crude oil? Write any four applications of Petroleum Products.

5. What is meant by cracking of Petroleum?

6. Write short notes on Reforming of Petroleum.

7. How do you determine the pour – point of an oil?

8. Write briefly about (i) Primary battery (ii) Secondary battery.

SECTION-B

Answer All the following questions **5X10=50M**

9. a) Describe with a neat diagram, production of coal gas mention its composition and applications.

(OR)

b) Write an essay on Renewable and Non-renewable Energy Sources.

10. a) Write an essay on Composition of Crude Petroleum.

(OR)

b) Write an essay on different types of Petroleum Products.

11. a) Explain principle and process of Fractional Distillation of Petroleum.

(OR)

b) Explain Thermal Cracking and Fixed bed Catalytic cracking of petroleum.

12. a) Write an essay on Lubricating oils.

(OR)

b) Write an essay on semi-solid lubricants and solid lubricants.

13. a) Explain briefly about Solar cell and Li-Battery.

(OR)

b) Describe the construction of Lead-acid battery with the reactions occurring during discharging and charging.

QUESTIONS BANK

FUEL CHEMISTRY AND BATTERIES - CBCHEB602

UNIT- 1

5M

1. What are fuels and explain their classification.
2. Write short notes on calorific value.
3. What are gross & net calorific values.
4. What is ignition temperature, what are the charactestics of a good fuel.
5. Explain the carbonization of coal.
6. Describe the production of producer gas mention its composition.
7. Describe the production o9f water gas mention its composition.
8. Write the uses of coal as fuel and non – coal.
9. Explain the catalytic gasification of coal.
10. Write any five uses of coal tar based chemicals.
11. What are the requisites of good metallurgical coke?

10M

1. Write an Essay on renewable and non-renewable energy sources.
2. Describe with a neat diagram, production of coal gas, mention its composition and applications.
3. Explain the fractionation of coal tar and write any five uses of coal tar based chemicals.

UNIT-2

5M

1. What is crude oil? Write any four applications of petroleum products.
2. How water and sulphur removed from crude oil during refining.

10M

1. Write an essay on composition of crude petroleum.
2. Explain the different types of petroleum products and their applications briefly.

UNIT-3

5M

1. What is meant by cracking of petroleum.
2. Write short notes on reforming of petroleum.
3. What are LPG, CNG, Bio – gas.
4. How fuels are derived from biomass and waste.

10M

1. Explain the principle and process of fractional distillation of petroleum.
2. Explain thermal and fixed bed catalytic cracking of petroleum.

3. What are petrochemicals? Name the petrochemicals which are derived from propylene oxide, butadiene, isoprene.

UNIT-4

5M

1. How do you determine the cloud point of an oil.
2. How do you determine the pore point of an oil.
3. How do you determine the viscosity Index of an oil.
4. What are Lubricants and explain their classification.
5. Write short notes on synthetic Lubricants.

10M

1. Write essay on lubricating oils.
2. Explain semi – solid lubricants & solid lubricants.
3. Write an essay on synthetic lubricants

UNIT-5

5M

1. Write briefly about (i) Primary battery (ii) Secondary battery
2. Write short notes on polymer cell.
3. What are the characteristics of a battery.
4. Explain briefly about solar cell.
5. Explain briefly about Li-Battery.

10M

1. Describe the construction of lead – acid battery with the reactions occurring during charging and discharging.
2. Write about the components of battery and their role.
3. Explain briefly about solar cell and Li-Battery.

Practical Paper – VIII-B-1

Paper Code: CBCHEB602P **30 hrs (2 h / W)**

1. Preparation of Aspirin
2. Preparation of Paracetamol
3. Preparation of Acetanilide

KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)
Department of Chemistry

Class:	Semester:	Title of The Paper:	Paper Code:	W.E.F
III BSC (CBZ, MPC, MCCS)	VI	ENVIRONMENTAL CHEMISTRY	CBCHEB603	2017-18

Syllabus

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory	Practical	3 Hours	CIA	SEE	
	4	3		25	75	

Objectives:

On successful completion of the course students will be able to understand:

1. The chemistry of the compounds of s& p-block elements and their compounds
2. The chemistry of ceramic materials
3. To develop expertise relevant to the professional practice of chemistry
4. To establish an appreciation of the role of inorganic chemistry in the chemical sciences

Course outcomes:

The student will gain an understanding of

- Composition and properties of glass, ceramics and cements.
- Types and manufacturing of different fertilizers
- Classification of alloys and surface coatings.

SEMESTER-VI

PAPER – VIII-B-2

INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE - CBCHEB603 45 hrs (3 h / w)

UNIT - I

Recapitulation of S- and P-Block Elements 8h

Periodicity in s- and p-block elements with respect to electronic configuration, atomic and ionic size, ionization enthalpy, electronegativity (Pauling, Mulliken, and Alfred - Rochow scales). Allotropy in C, S, and P. Oxidation states with reference to elements in unusual and rare oxidation states like carbides and nitrides), inert pair effect, diagonal relationship and anomalous behaviour of first member of each group.

UNIT – II 15h

Silicate Industries

Glass: Glassy state and its properties, classification (silicate and non-silicate glasses). Manufacture and processing of glass. Composition and properties of the following types of glasses: Soda lime glass, lead glass, armoured glass, safety glass, borosilicate glass, fluorosilicate, coloured glass, photosensitive glass.

Ceramics: Important clays and feldspar, ceramic, their types and manufacture. High technology ceramics and their applications, superconducting and semiconducting oxides, fullerenes carbon nanotubes and carbon fibre.

Cements: Classification of cement, ingredients and their role, Manufacture of cement and the setting process, quick setting cements.

UNIT – III 8h

Fertilizers:

Different types of fertilizers. Manufacture of the following fertilizers: Urea, ammonium nitrate, calcium ammonium nitrate, ammonium phosphates; polyphosphate, superphosphate, compound and mixed fertilizers, potassium chloride, potassium sulphate.

UNIT – IV **8h**

Surface Coatings:

Objectives of coatings surfaces, classification of surface coatings. Paints and pigmentsformulation, composition and related properties. Oil paint, Vehicle, modified oils, Pigments, toners and lakes pigments, Fillers, Thinners, Enamels, emulsifying agents. Special paints (Heat retardant, Fire retardant, Eco-friendly paint, Plastic paint), Dyes, Wax polishing, Water and Oil paints, Metallic coatings (electrolytic and electroless).

UNIT – V **6h**

Alloys:

Classification of alloys, ferrous and non-ferrous alloys, Specific properties of elements in alloys. Manufacture of Steel (removal of silicon decarbonization, demanganization, desulphurization dephosphorisation) and surface treatment (argon treatment, heat treatment, nitriding, carburizing). Composition and properties of different types of steels.

MODEL PAPER

INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE - CBCHEB603

SECTION-A

Answer any FIVE of the following questions **5X5=25M**

1. What is Allotropy? What are different allotropic modifications of Carbons?
2. Write short notes on anomalous behaviour of Lithium.
3. Write a note on raw materials in glass making.
4. What is Clay? How plasticity of clay can be increased?
5. Write a note on Nitrogenous Fertilizers.
6. Write short notes on Mixed Fertilizers.
7. What is Paint? State characteristics of a good Paint.
8. Write a short note on heat treatment of steel.

SECTION-B

Answer ALL the following questions **5X10=50M**

9. a) Explain the following Periodic properties of s-block elements

(i) Ionic Size (ii) Ionization enthalpy (iii) Electro Negativity

(OR)

b) Describe the following with suitable example.

(i) Inert pair effect (ii) Diagonal relationship

10. a) What is Glass? Discuss the manufacture of Glass.

(OR)

b) Explain the composition and classification Cement.

11. a) What are Fertilizers? Explain different types of Fertilizers.

(OR)

b) Write the manufacture of Urea.

12. a) What are Surface Coatings? Explain the classification of Surface Coatings.

(OR)

b) Write a short note on

(i) Eco – friendly Paint (ii) Plastic Paint

13. a) What are Alloys? Explain Ferrous and Non-Ferrous Alloys.

(OR)

b) Explain the properties of different types of Steels.

QUESTION BANK

INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE - CBCHEB603

UNIT-I:

5M

1) Give a brief account of the allotropic forms of carbon

2) Write a short note on the allotropic forms sulphur

3) Illustrate and and explain the "Inert pair effect" with suitable example

4) Write a note on abnormal behaviour of Lithium.

5) Why boron is diagonally related to silicon

10M

1. Explain the following periodic properties of s-block elements

i. Ionic size ii. Ionization enthalpy iii. Electro negativity

2. Describe the following with suitable example

i) Inert pair effect ii) Diagonal relation ship

3. What is allotropy? Explain different allotropic forms of Phosphorus

UNIT – II

5M

1. Write an account of soda lime glass and safety glass?

2. Give the composition, properties and uses of boro silicate glass?

3. Write any five applications of ceramics?

4. Write a short note on high technology ceramics.

5. Write a brief account on setting of cement.

6. What is clay? How plasticity of clay can be increased?

7. Write a brief account of composition of cement?

10M

1) Discuss the manufacture of glass

2) What are the raw materials required for the manufacture of glass. What are the various types of glass? Mention their important uses?

3) What are ceramics? Write the properties and classification of ceramics.

4) What is cement? Explain the manufacture of Portland cement?

UNIT – III

5M

1) Write a short note on nitrogenous fertlizers?

2) Write a brief note on mixed fertilizers

3) Write a brief note on the manufacture of ammonium phosphate?

10M

1) What are fertilizers? Explain different types of fertilizers

2) Write about the manufacture of urea?

3) What are NPK fertilizers? Explain with suitable examples?

UNIT – IV

5M

1) What is paint? Outline any five characteristics of a good paint?

2) Write a short note on metallic coatings?

3) Write a short note on Eco-friendly paints?

4) Write a short note on Plastic paints?

5) Write a short note on Oil paints

6) Write a short on characteristics of Enamels?

10M

1) What are surface coatings? Explain the classification of surface coatings?

2) What are Paints? Name the various constituents of paints and their function?

3) What are constituent of paints? Give examples. What are their functions?

UNIT – V

5M

1) Write a note on the heat – treatment of steels?

2) Write a short note on carburizing?

3) Write a short note on nitriding?

10M

1) What are Alloys? Explain ferrous and nonferrous alloys?

2) Explain the properties of different types of steels?

Practical Paper – VIII-B-2: **30 hrs (2 h / W)**

Paper Code: CBCHEB603P

1. Green procedure for organic qualitative analysis: Detection of N, S andhalogens
2. Acetylation of 1^0 amine by green method: Preparation of acetanilide
3. Rearrangement reaction in green conditions: Benzil-Benzilic acid rearrangement
4. Electrophilic aromatic substitution reaction: Nitration of phenol
5. Radical coupling reaction: Preparation of 1,1-bis -2-naphthol
6. Green oxidation reaction: Synthesis of adipic acid
7. Green procedure for Diels Alder reaction between furan and maleic anhydride

KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)
Department of Chemistry

Class:	Semester:	Title of The Paper:	Paper Code:	W.E.F
III BSC (CBZ, MPC, MCCS)	VI	ENVIRONMENTAL CHEMISTRY	CBCHEB604	2017-18

Syllabus

Total No of Hours for Teaching - Learning	Instructional Hours for Week		Duration of Semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory	Practical	3 Hours	CIA	SEE	
	4	3		25	75	

Objectives:

1. The graduate with chemistry as one of the subject is expected to have the ability to apply scientific knowledge and technical skills to the changing need of chemical labs and allied industries.

2. Identify industrial problems related to analysis and find solutions for them.

3. Able to work in quality control or in analytical laboratories.

Course outcomes:

The student will gain an understanding of

- Analysis of soaps, oils and fertilizers
- Analysis of gases(fuel gases) and analysis of complex materials

SEMESTER-VI

PAPER – VIII-B-3 : ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS

Paper Code - CBCHEB604 **45 hrs (3 h /w)**

UNIT-I

Analysis of soaps: moisture and volatile matter, cobined alkali, total fatty matter, free alkali, total fatty acid, sodium silicate and chlorides. Analysis of paints :Vehicle and pigments, Barium Sulphate, total lead, lead chromate, iron pigments, zinc chromate

UNIT- II

Analysis of oils: saponification value, iodine value, acid value, ester value, bromine value, acetyl value. Analysis of industrial solvents like benzene, acetone, methanol and acetic acid., Determination of methoxyl and N-methyl groups.

UNIT-III

Analysis of fertilizers: urea, NPK fertilizer, super phosphate, Analysis of DDT, BHC, endrin, endosulfone, malathion, parathion. Analysis of starch, sugars, cellulose and paper.

UNIT -IV

Gas analysis: carbon dioxide, carbon monoxide, oxygen, hydrogen, saturated hydro carbon, unsaturated hydrocarbons, nitrogen, octane number, cetane number.

Analysis of Fuel gases like: water gas, producer gas, kerosene (oil) gas.

Ultimate analysis : carbon, hydrogen,nitrogen,oxygen, phosphorus and sulfur.

UNIT - V

Analysis of Complex materials:

Analysis of cement- loss on ignition, insoluble residu, total silica, sesqui oxides, lime, magnesia, ferric oxide, sulphuric anhydrid. Analysis of glasses - Determinaiton of silica,

sulphuur, barium, arsinic, antimony, total R_2O_3, calcium, magnesium, total alkalies, aluminium, chloride, floride.

MODEL PAPER

ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS - CBCHEB604

SECTION-A

Answer any FIVE of the following questions **5X5=25M**

1. Explain the determination of combined alkali, free alkali of a given soap.

2. What are the important characteristics of a Good Pigment?

3. Define ester value, acetyl value of an oil.

4. Explain briefly the analysis of solvent Benzene.

5. Write a short note on super phosphate.

6. Explain the analysis of Starch.

7. Write short notes on Octane Number & Cetane Number.

8. Explain the determination of Chloride, in a given glass.

SECTION-B

Answer ALL the following questions 5X10=50M

9. a) Explain the determination of total fatty matter, total fatty acid of a soap.

(OR)

b) Describe the analysis of any three constituents of the given paint.

10. a) What is meant by Acid value of an oil? Explain the determination of acid value of an oil.

(OR)

b) What is meant by saponification value of an oil? Explain the determination of Saponification value of an oil.

11. a) Explain the analytical procedure for the determination of Urea in a given sample.

(OR)

b) How do you analysing the following pesticides?

(i) DDT (ii) BHC

12. a) Explain the analysis procedure of CO_2, CO, N_2 gases.

(OR)

b) How ultimate analysis of coal is carried out in the Laboratory?

13. a) Explain briefly the analysis of Portland Cement.

(OR)

b) Explain the Determination of total alkali and silica in the given glass.

Semester – VI

Paper Code - VIII – B – 3:

Title: ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS - CBCHE B 604

QUESTION BANK

UNIT – I

5M

1. Explain the determination of combined alkali, free alkali of a given soap.
2. Write a short note on determination of moisture of a soap
3. What are the important characteristics of a Good Pigment?
4. What are drying oils (Vehicle)? Why are drying oils used in paints.

10M

1. Explain the determination of total fatty matter, total fatty acid of a soap?
2. Describe the analysis of any three constituents of the given paint?
3. Explain the following analysis of paints?

a. Total Lead b. Barium sulphate

UNIT – II

5M

1. Define ester value, acetyl value of an oil
2. Explain briefly the analysis of solvent Benzene.
3. How do you analyse the N- Methyl groups
4. How do you analyse the Methoxye groups
5. How do you analyse the solvent benzene
6. Explain the determination of Acetyl value of an oil?

10M

1. Define acid value of an oil? Explain the determination of acid value of an oil?
2. Define saponification value of an oil? Explain the determination of saponification value of an oil?
3. Define Iodine value of an oil? Explain the determination of Iodine value of oil?

UNIT – III

5M

1. Write a short note on super phosphate
2. Write a brief note on the analysis of Starch.
3. Write a short note on Endrin, Endosulfone
4. Write a short note on cellulose and paper.

10M

1. Explain the analytical procedure for the determination of urea in a given sample?
2. How do you analysing the following pesticides?

a. DDT b. BHC

3. Explain the analytical procedure of sugar?

(Reducing sugars (Glucose / Fructose)

4. Explain the determination of glucose in a given sample by Fehling's solution?

UNIT – IV

5M

1. Write the ultimate analysis of coal w.r.t phosphorous and mention its significance
2. What is meant by octane number and cetane number?
3. How producer gas can be analysed?

10M

1. Write the ultimate analysis of coal with respect to

a. Carbon & Hydrogen b. Nitogen c. Oxygen d. Sulphur.

2. What is meant by water gas? Explain the analytical procedure for determination of water gas.
3. How CO_2 and CO gases are analysed.

UNIT – V

5M

1. Explain the determination of chloride, in a given glass.
2. What are sesqui oxides in the cement composition? Write their functions.

10M

1. Explain briefly the analysis of Portland Cement?

(Any two components)

2. Explain the determination of total alkali and silica in the given glass.

VIII-B-3 Practical:- Project Work / Intern Ship