

GOVT.DEGREE COLLEGE

RAJAMPETA

DEPARTMENT OF CHEMISTRY



CBCS CHEMISTRY SYLLUBUS

III SEMESTER

(w.e.f. 2015-16)



***Affiliated
to***

YOGI VEMANA UNIVERSITY

KADAPA

SEMESTER - III
Paper III (INORGANIC & ORGANIC CHEMISTRY) 60 hrs (4 h / w)

INORGANIC CHEMISTRY

30 hrs

(2h / w) UNIT –I

1. Chemistry of d-block elements:

9h

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: 6h

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

UNIT – II

3. Metal carbonyls :

7h

EAN rule, classification of metal carbonyls, structures and shapes of metal carbonyls of V, Cr, Mn, Fe, Co and Ni.

4. Chemistry of f-block elements:

8h

Chemistry of lanthanides - electronic structure, oxidation states, lanthanide contraction, consequences of lanthanide contraction, magnetic properties. Chemistry of actinides - electronic configuration, oxidation states, comparison of lanthanides and actinides.

ORGANIC CHEMISTRY

30 h (2h/w)

UNIT – III

1. Halogen compounds

5 h

Nomenclature and classification of alkyl (into primary, secondary, tertiary), aryl, aryl alkyl, allyl, vinyl, benzyl halides.

SN¹ and SN² – reaction mechanism with optically active alkyl halide 2-bromobutane.

2. Hydroxy compounds

5 h

Nomenclature and classification of Alcohols: Preparation with hydroboration reaction and Grignard synthesis. Physical properties- Hydrogen bonding (intermolecular and intramolecular). Effect of hydrogen bonding on boiling point and solubility in water.

Chemical properties:

a) Dehydration of alcohols.

b) Oxidation of alcohols by CrO_3 , KMnO_4 . Identification of alcohols by oxidation with KMnO_4 , Ceric ammonium nitrate, Luca's reagent Phenols: Preparation i) from diazonium salt, ii) from cumene.

Chemical Properties: a) Bromination, b) Kolbe-Schmidt reaction (with mechanism)

c) Reimer-Tiemann reaction, (with mechanism), d)

azocoupling, Identification of Phenol with neutral FeCl_3

UNIT-IV

Carbonyl compounds

10 h

Nomenclature of aliphatic and aromatic carbonyl compounds, Synthesis of aldehydes from acid chlorides, synthesis of ketones from nitriles. Physical properties: Reactivity of carbonyl group in aldehydes and ketones.

Nucleophilic addition reaction with a) NaHSO_3 , b) HCN , c) RMgX , d) NH_2OH ,

e) PhNHNH_2 , f) 2,4 DNPH, With mechanism a) Aldol, b) Cannizzaro's reaction,

c) Perkin reaction, d) Benzoin condensation, Reduction: Clemmensen reduction,

Wolf-Kishner reduction, MPV reduction, reduction with LiAlH_4 and NaBH_4 .

Analysis of aldehydes and ketones with a) 2,4-DNPH test, b) Tollen's test, c)

Fehling test, d) Schiff's test e) Haloform test (with equation)

UNIT-V

1. Carboxylic acids and derivatives

6 h

Nomenclature, classification of carboxylic acids. Methods of preparation by Hydrolysis of nitriles, amides and esters (by acids and bases), c) Carbonation of Grignard reagents. Special methods of preparation of aromatic acids by a) Oxidation of side chain. b) Hydrolysis by benzotrichlorides. c) Kolbe

reaction. **Physical properties:** Hydrogen bonding, dimeric association, **Chemical**

properties: Reactions involving H, OH and COOH groups- salt formation, anhydride formation, acid chloride formation, amide formation and esterification (mechanism). Degradation of carboxylic acids by

Hunsdiecker reaction, decarboxylation by Schindt reaction, halogenation by Hell-Volhard-Zelinsky reaction.

2. Active methylene compounds

4 h

Acetoacetic ester: keto-enol tautomerism, preparation by Claisen condensation, Acid hydrolysis. Preparation of a) monocarboxylic acids. b) Dicarboxylic acids.

c) Reaction with urea

Malonic ester: preparation. **Synthetic applications:** Preparation of a) monocarboxylic acids (propionic acid and n-butyric acid). b) Dicarboxylic acids (succinic acid and adipic acid) c) α,β -unsaturated carboxylic acids (crotonic acid). 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 Bahl and Arun bahl
4. A Text Book of Organic chemistry by I L Finar Vol I
5. Organic chemistry by Bruice
6. Organic chemistry by Clayden
7. Advanced Inorganic chemistry by Gurudeep Raj
8. Basic Inorganic Chemistry by Cotton and Wilkinson
9. Concise Inorganic Chemistry by J.D.Lee

LABORATORY COURSE -III

30 hrs. (2 h / w)

Practical Paper-III Titrimetric analysis and Organic Functional Group Reactions

(At the end of Semester-III)

Titrimetric analysis:

25M

1. Determination of Fe (II) using KMnO_4 with oxalic acid as primary standard.
2. Determination of Cu(II) using $\text{Na}_2\text{S}_2\text{O}_3$ with $\text{K}_2\text{Cr}_2\text{O}_7$ as primary standard.

Organic Functional Group Reactions

25M

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