**A.S.D.Govt.Degree College for Women(A),Kakinada**

**Chemistry Syllabus**

**A.S.D.GOVERNMENT DEGREE COLLEGE FOR WOMEN (A), KAKINADA**

**DEPARTMENT OF CHEMISTRY**

**BOARD OF STUDIES: 2017-18**

**FIRST YEAR, SEMESTER – I Dt:29th June,2017**

**INORGANIC & ORGANIC CHEMISTRY 60hrs (4h / w)**

**INORGANIC CHEMISTRY – I 30hrs (2h/W)**

**UNIT – I**

1. **P-BLOCK ELEMENTS: 15h**

General characteristics of elements of groups 13, 14 and 15

**Group - 13**: Synthesis and structure of Diborane and Higher Boranes (B4H10 and

B5H9), Boron-Nitrogen compounds (B3N3H6 and BN)

**Group-14:**Preparation, Structure and applications of silanes and silicones, graphitic compounds.

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

**UNIT – II**

1. **P-BLOCK ELEMENTS: 8h**

General characteristics of elements of groups 16 and 17

**Group – 16:** Classification of oxides based on (i) chemical behaviour and (ii) oxygen content

**Group – 17:** Inter halogen compounds and pseudo halogens.

1. **ORGANOMETALLIC CHEMISTRY: 7h**

Definition and classification of Organometallic compounds, Nomenclature, preparation, properties and applications of alkyls of Li and Mg elements.

**ORGANIC CHEMISTRY - I 30hrs (2h/W)**

**UNIT – III**

1. **STRUCTURAL THEORY IN ORGANIC CHEMISTRY 10 h**

Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radical reagents including neutral molecules like H2O, NH3 & AlCl3).

**Bond polarization:** Factors influencing the polarization of covalent bonds, electro 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 (mechanism not required).

**UNIT – IV**

1. **ACYCLIC HYDROCARBONS 6 h**

**Alkenes** – Preparation of alkenes (a) by dehydration of alcohols (b) by dehydrohalogenation of alkyl halides (c) by dehalogenation of 1, 2 dihalides (brief mechanism), Saytzev’s rule. Properties: Addition of hydrogen – heat of hydrogenation and stability of alkenes. Addition of halogen and its mechanism. Addition of HX, Markonikov’s rule, addition of H2O, HOX, H2SO4 with mechanism and addition of HBr in the presence of peroxide (anti – Markonikov’s addition).Oxidation – hydroxylation by KMnO4, OsO4, peracids (via epoxidation) hydroboration, Dienes – Types of Dienes, reactions of conjugated dines – 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 tetra halides, Properties; Acidity of acetylenic hydrogen (formation of Metal acetylides). Preparation of higher acetylenes, Metal ammonia reductions Physical properties. Chemical reactivity – electrophilic addition of X2, HX, H2O (Tautomerism), Oxidation with KMnO4, OsO4, reduction and Polymerisation reaction of acetylene.

1. **ALICYCLIC HYDROCARBONS (CYCLOALKANES) 4 h**

Nomenclature, Preparation by Freunds methods, heating dicarboxylic metal salts. 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**

1. **BENZENE AND ITS REACTIVITY 10 h**

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 NO2 and Phenolic). (Explanation by taking minimum of one example from each type).

**LABORATORY COURSE: 30 hrs (2h / w)**

**Practical – I** (At the end of Semester – I)

**Qualitative Inorganic analysis and Inorganic Preparations:**

1. **Qualitative Inorganic analysis:**

Analysis of simple salt containing the following one anion and cation

**Analysis of Anions:** Carbonate, Sulphate, Chloride, Bromide, Iodide, Acetate, Nitrate, Borate, Phosphate.

**Analysis of Cations:** Lead, Copper, Cadmium, Iron, Aluminum, Zinc, Manganese, Nickel, Calcium, Strontium, Barium, Potassium and Ammonium.

1. **Inorganic Preparations:** Any **one** of the following preparations:
2. Ferrous ammonium sulphate
3. Tetrammine copper (II) sulphate