

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS):: KARUR – 639 005****B.Sc., CHEMISTRY COURSE STRUCTURE UNDER CBCS SYSTEM**

(For the candidates admitted from the year 2011-12 onwards)

SEMESTER	COURSE	SUBJECT TITLE	SUBJECT CODE	INSTR. HOURS WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
							INT	ESE	
I	Tamil - I	Tamil – I	U11L1T1	6	3	3	25	75	100
	English - I	English – I	U11L1E1	6	3	3	25	75	100
	Core Course – I	General Chemistry – I	U11CH1C1	6	5	3	25	75	100
	Core Course – II	Volumetric Analysis (Practical)	-	3	-	-	-	-	-
	First Allied Course-I	Allied Physics – I	U11PH1A1	5	3	3	25	75	100
	First Allied Course – II	Allied Physics – II (Practical)	-	2	-	-	-	-	-
	Environmental Studies	Environmental Studies	UES1	2	2	3	25	75	100
			<b>30</b>	<b>16</b>				<b>500</b>	
II	Tamil – II	Tamil – II	U11L2T2	6	3	3	25	75	100
	English – II	English – II	U11L2E2	6	3	3	25	75	100
	Core Course – II	Volumetric Analysis – (Practical)	U11CH2C2P	3	4	3	25	75	100
	Core Course – III	General Chemistry - II	U11CH2C3	6	5	3	25	75	100
	First Allied Course - II	Allied Physics – II (Practical)	U11PH2A2P	2	4	3	25	75	100
	First Allied Course – III	Allied Physics - III	U11PH2A3	5	3	3	25	75	100
	Value Education	Value Education	UVE2	2	2	3	25	75	100
			<b>30</b>	<b>24</b>				<b>700</b>	
III	Tamil - III	Tamil- III	U11L3T3	6	3	3	25	75	100
	English – III	English -III	U11L3E3	6	3	3	25	75	100
	Core Course – IV	General Chemistry - III	U11CH3C4	6	5	3	25	75	100
	Core Course V	Semi Micro Qualitative Analysis – (Practical II)	-	3	-	-	-	-	-
	Second Allied Course-I	Allied Zoology/Allied Mathematics - I	U11Z03A1/ U11MM3A1	5	3	3	25	75	100
	Second Allied Course-II	Allied Zoology Practical/Allied Maths II	-	2	-	-	-	-	-
	Non Core Elective I	Energy Physics I	U11PH3N1	2	2	3	25	75	100
			<b>30</b>	<b>16</b>				<b>500</b>	
IV	Tamil – IV	Tamil- IV	U11L4T4	6	3	3	25	75	100
	English – IV	English -IV	U11L4E4	6	3	3	25	75	100
	Core Course – V	Semi Micro Qualitative Analysis – (Practical II)	U11CH4C5P	2	4	3	25	75	100
	Core Course VI	General Chemistry - IV	U11CH4C6	5	5	3	25	75	100
	Second Allied Course II	Allied Zoology practical / Allied Mathematics III	U11Z04A2P/ U11MM4A2P	2	4	3	25	75	100
	Second Allied Course III	Allied Zoology /Allied Mathematics IV	U11Z04A3/ U11MM4A3	5	3	3	25	75	100
	Skill Based Elective I	Laboratory Hygiene and Safety	U11CH4S1	2	4	3	25	75	100
	Non Core Elective II	Energy Physics II	U11PH4N2	2	2	3	25	75	100
			<b>30</b>	<b>28</b>				<b>800</b>	
V	Core Course – VII	Inorganic Chemistry – I	U11CH5C7	5	5	3	25	75	100
	Core Course – VIII	Organic Chemistry – I	U11CH5C8	5	4	3	25	75	100
	Core Course – IX	Physical Chemistry - I	U11CH5C9	5	4	3	25	75	100
	Core Course - X	Physical Chemistry – (Practical)	-	3	-	-	-	-	-
	Core Course - XI	Gravimetric and Organic Compound Analysis (Practical)	-	3	-	-	-	-	-
	Elective Course - I	Industrial Chemistry	U11CH5E1	5	5	3	25	75	100
	Skill Based Elective II	Spectroscopy - I	U11CH5S2	2	4	3	25	75	100
	Skill Based Elective III	Spectroscopy - II	U11CH5S3	2	4	3	25	75	100
			<b>30</b>	<b>26</b>				<b>600</b>	
VI	Core Course – X	Physical Chemistry (Practical)	U11CH6C10P	3	4	3	25	75	100
	Core Course – XI	Gravimetric and Organic Compound Analysis (Practical)	U11CH6C11P	3	5	3	25	75	100
	Core Course – XII	Inorganic Chemistry - II	U11CH6C12	6	5	3	25	75	100
	Core Course - XIII	Organic Chemistry - II	U11CH6C13	6	5	6	25	75	100
	Elective Course - II	Analytical Chemistry	U11CH6E2	5	5	3	25	75	100
	Elective Course - III	Physical Chemistry - II	U11CH6E3	6	4	3	25	75	100
	Extension Activities	Extension Activities		-	1	-	-	-	-
	Gender Education	8UEA6	1	1	3	25	75	100	
			<b>30</b>	<b>30</b>				<b>700</b>	
<b>TOTAL</b>				<b>180</b>	<b>140</b>				<b>3800</b>

**B.Sc., CHEMISTRY - I SEMESTER – CORE COURSE - I**

(For the candidates admitted from the year 2011-12 onwards)

## GENERAL CHEMISTRY - I

- UNIT - I Inorganic Chemistry 15 hours**
- 1.1 Volumetric Analysis**  
Standard Solutions – Primary and Secondary Standards – Types of Titrimetric reactions – Redox – Precipitation – EDTA – Titrations. Indicators – Effect of change in pH – Neutralisation – Mixed and Fluorescent indicators.
- 1.2 Boron Family**  
Comparative study of Boron Family Elements and their Compounds (Hydrides, Oxides and Halides) – Chemistry of Diaborane, Borax and Borazole.
- 1.3 Carbon Family**  
Comparative study of Carbon Family Elements and their Compounds (Hydrides, Oxides and Halides) – Chemistry of Cyanogen, Hydrocyanic Acid, Cyanic Acid, Thiocyanic Acid, Ammonium Thiocyanate and Carbon Disulphide. Structure of Graphite, Diamond and Fullerene.
- UNIT-II Inorganic Chemistry 15 hours**
- 2.1** Chemical Bonding Lattice Energy and Born-Haber Cycle  
**2.2** Polarising power and Polarisability – Partial ionic character from electronegativity – Transition from ionic to covalent character and vice – versa – Fajan's rule – Concept of hard and soft acids and bases.  
**2.3** VSEPR Theory shapes of simple inorganic molecules (BeCl<sub>2</sub>, SiCl<sub>4</sub>, PCl<sub>5</sub>, SF<sub>6</sub>, IF<sub>7</sub>, H<sub>2</sub>O, NH<sub>3</sub>, and XeF<sub>6</sub> containing lone pair and bond pairs of electrons – Lewis structures. Hydrogen bonding – Its nature, types, effect on Properties. Intermolecular forces – London forces and vander Waals forces.
- UNIT - III Organic Chemistry 15 hours**
- 3.1 Petroleum** Thermal and Catalytic Process of Cracking  
Synthetic Petrol – Fischer Tropsch's process and Bergius Process, Flash Point, Fire Point, Smoke Point, Knocking, Octane number and Cetane number, Antiknocking Agents, Power Alcohol, Biodiesel.
- 3.2 Alkenes**  
Preparation by Dehydration, dehydrohalogenation methods – Reduction of alkynes, Witting reaction Kolbe's electrolysis – Properties of Alkenes – Electrophilic and free radical addition, addition reactions with hydrogen bromide (peroxide effect) sulphuric acid, water, hydroboration, ozonolysis, hydroxylation with KMnO<sub>4</sub> – allylic substitution by NBS (An elementary idea).
- UNIT - IV Organic Chemistry 15 hours**
- 4.1** Electron displacement effects – Inductive, Inductometric, Electrometric, Mesomeric, resonance, hyperconjugation and steric effects.  
Cleavage of Bonds – Homolytic and Heterolytic fission of carbon – Carbon bonds, Reaction intermediates – Free Radicals, Carbocations and Carbanions, Carbenes their stability.
- 4.2 Alkynes**  
Preparation of alkynes – Dehydrohalogenations, dehalogenation, hydration of calcium carbide – Kolbe's electrolysis.  
Acidity of alkynes – formation of acetylides – addition of water with HgSO<sub>4</sub> catalyst, addition of hydrogen halides and halogens, oxidation, ozonolysis and hydroboration. (An elementary idea).
- UNIT - V Physical Chemistry 15 hours**
- 5.1 Gaseous State** Critical Phenomena – PV isotherms of real gases, critical temperature, continuity of state – relation between critical constants and van der Waals constants – Determination of critical volume - the law of corresponding states – reduced equation of state.  
Molecular velocities – Root mean square, average and most probable velocities – Maxwell Boltzmann distribution of molecular velocities (no derivations) – Collision number and mean free path – Collision diameter.
- 5.2 Liquid Crystals**  
Liquid crystals – classification, structure, properties and applications.

**Books Recommended:**

1. J.D.Lee, Concise Inorganic Chemistry, 5<sup>th</sup> Edition, Blackwell science.
2. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, S.L.N. Chand & Co.
3. B.S. Bahl and Arun Bahl, Advanced Organic Chemistry, S.Chand & Co.
4. I.L. Finar, Organic Chemistry, Vol.I Pearson Education, 6<sup>th</sup> Edition.
5. B.R. Puri, L.R. Sharma and N.S. Pathania, Principles of Physical Chemistry Vishal Publishing Co. 41<sup>st</sup> Edition.
6. P.L. Soni & O.P. Dharmarha, Text Book of Physical Chemistry, Sultan Chand & Sons.

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05****B.SC., - I & III - SEMESTER – FIRST / SECOND ALLIED COURSE - I**

(For the candidates admitted from the year 2011-12 onwards)

**(FOR BOTANY, MATHEMATICS, PHYSICS & ZOOLOGY MAJOR)****ALLIED CHEMISTRY –I**

- UNIT- I (15 hours)**
- 1.1 Volumetric Analysis : Standard Solution – Primary and Secondary Standards – Types of titrimetric reactions – reactions – redox- precipitation – EDTA titrations.
  - 1.2 Laboratory Hygiene and Safety: Storage and handling of corrosive, flammable, explosive, toxic, carcinogenic and poisonous Chemicals.
  - 1.3 Simple first aid procedure for Accidents: Acid in eye, alkali in eye, acid burns, alkali burns, poisoning, inhalation of gases, cut by glasses and heat burns.
- UNIT –II (15 hours)**
- 2.1 Water: Soft water – Temporary and permanent hardness of water - Treatment of water for municipal purpose – Softening of water - Definition – Softening by Zeolite Process.
  - 2.2 Atomic Structure: Rutherford’s Nuclear Atom –Bohr’s Model of the atom- Bohr Sommerfeld theory - Distribution of electrons –Pauli Exclusion Principle-Hund’s Rule of maximum Multiplicity – Aufbau Principle.
- UNIT-III (15 hours)**
- 3.1 Radioactivity – Definition – types of radioactive rays – Nuclear energy – mass defect – binding energy – magic Numbers – Nuclear fission – Nuclear fusion – difference between Nuclear fission and fusion – Nuclear power plant
  - 3.2 Isotopes, Isobars and Isotones.
- UNIT – IV (15 hours)**
- 4.1 Classification and Nomenclature of organic of Compounds classification of organic compounds – functional groups – homologous series.
  - 4.2 IUPAC System of nomenclature of simple and complex aliphatic compounds.
- UNIT- V (15 hours)**
- 5.1 Polymerisation – Introduction –Preparation of Polymers – addition polymers (Polyethylene, PVC and Teflon) – Condensation polymers (nylon – 6,6 and terylene)
  - 5.2 Synthetic rubbers(BUNA, Butyl rubber and SBR) Thermoplastic and thermosetting plastic.

**Books Recommended:**

1. R.Gopalan, P.S.Subramanian, K.Rengarajan – Elements of Analytical Chemistry Sultan chand & Sons New Delhi -2
2. B.K.Sharma “Industrial Chemistry” GOEL Publishing House Meerut.
3. P.L.Soni and Mohan Katyal “Text Book of inorganic Chemistry 20<sup>th</sup> Revised Edition, Sultan Chand 1992.
4. U.N.Dash-Nuclear Chemistry Sultan Chand & Sons New Delhi-2.
5. I.L.Finar-Organic Chemistry. The fundamental Principles ELBS English Lan.
6. P.L.Soni H.M.Chawla “Text Book of organic chemistry sultan chand and sons New Delhi-2.
7. B.S.Bahl and Arun Bahl ‘Advanced Organice chemistry S.Chand and Co New Delhi.

Sl. No.: 12P2

Subject Code: U11CH2C2P

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS):: KARUR-05**

**B.Sc., CHEMISTRY - II SEMESTER – CORE COURSE - II**

(For the candidates admitted from the year 2011-12 onwards)

**VOLUMETRIC ANALYSIS**

- UNIT- I** ACIDMETRY AND ALKALIMETRY  
**UNIT-II** PERMANGANIMETRY  
1. Estimation of Ferrous I ( r ) on in Mohr's salt  
2. Estimation of Ferrous and Ferric I (r) ons in a misture  
3. Estimation of Oxalic acid  
4. Estimation of Calcium  
**UNIT - III** DICHROMETRY  
5. Estimation of Ferrous Iron  
6. Estimation of Ferric Iron by using both internal and external indicators.  
**UNIT -IV** IODO AND IODIMETRY  
7. Estimation of Copper  
8. Estimation of Potassium Dichromate.  
9. Estimation of Arsenious Oxide.  
**UNIT – V** ARGENTOMETRY  
10. Estimation of Chloride ( in neutral and acid media )  
**UNIT – VI** COMPLEXOMETRIC TITRATIONS  
11. Estimation of Zn, Mg and Ca ions using EDTA.  
**UNIT – VII** Determination of melting and boiling points of simple organic compounds

Marks:

Int.Asst.	25
Practical	75
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Total	100
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**COE**

Sl. No.: 1208

Subject Code: U11CH2C3

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05****B.Sc., CHEMISTRY - II SEMESTER – CORE COURSE - III**

(For the candidates admitted from the year 2011-12 onwards)

**GENERAL CHEMISTRY- II****UNIT- I Inorganic Chemistry ( 18 hours )**

## 1.1 Nitrogen family

1.1.1 Chemistry of hydrazine, hydrazonic acid, hydroxyl amine and sodium bismuthate.

1.1.2 Non aqueous solvents – classification – liquid ammonia as solvent.

1.2 Ozone – Preparation, Properties, structural elucidation and uses. Green – house effect, ozone hole, causes and protection of ozone layer.

1.3 Hydrogen peroxide - Preparation, Properties, estimation, structure and uses.

1.4 Peracids of sulphur – their preparation, properties, uses and structures.

1.5 Sodium hyposulphate and sodium thiosulphate – preparation, properties, uses and structures.

**UNIT-II Organic Chemistry ( 18 hours )**

## 2.1 Dienes

Types of dienes – conjugated, isolated and cumulated

2.1.1 Stability and chemical reactivity – 1,2 and 1,4 additions, kinetic and thermodynamic controls of reaction. Diels – Alder reaction.

2.1.2 Synthesis of dienes – 1,3 – Butadiene, isoprene and chloroprene.

## 2.2 Cycloalkanes

2.2.1 Preparation using Wurtz's reaction, Dieckmann's ring closure and reductions of aromatic hydrocarbons.

2.2.2 Substitution and ring opening reactions.

2.2.3 Bayer's strain theory and theory of strainless rings.

**UNIT - III Polymer Chemistry ( 18 hours )**

3.1 Classification of polymers – natural, synthetic, semi synthetic, plastic, elastomers, addition, condensation polymers.

3.1.1 Mechanism of free radical, radical, anionic cationic – preparation of polyurethane.

Synthetic rubber – butyl. Buna –S, buna-N, neoprene, SBR, thiocol, silicone rubber, thermocole, nylons 6 and 6,6 and terylene.

**UNIT – IV Physical Chemistry ( 18 hours )**

4.1 Colloidal States: Stability of Colloids, Coagulation and protection, Reverse Osmosis, Desalination of sea water, Donnan membrane- Gels and emulsion.

4.2 Macro molecules : Number average and weight average molecular weight of macromolecules – determination of molecular weight by Osmometry ( number average ), ultra centrifuge(weight average), Viscometry and light scattering.

**UNIT - V Physical Chemistry ( 18 hours )**

## 5.1 Solid State

5.1.1 Isotropic and anisotropic solids.

5.1.2 Nature of the solid state – seven crystal systems – Bravais lattice, unit cell, law of rational indices (Weiss indices) Miller indices, symmetry elements in crystals (for cubic system only in detail)

5.1.3 X-ray diffraction by crystals – derivation of Bragg's – equation – Bragg method – powder method – crystal structure of NaCl, KCl, ZnS and CsCl – radius ratio and packing in Crystals-determination of Avogadro's number.

**Books Recommended:**

1. J.D.Lee, Concise Inorganic Chemistry, 5<sup>th</sup> Edition, Blackwell science.
2. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, S.L.N. Chand & Co.
3. B.S. Bahl and Arun Bahl, Advanced Organic Chemistry, S.Chand & Co.
4. I.L. Finar, Organic Chemistry, Vol.I Pearson Education, 6<sup>th</sup> Edition.
5. B.R. Puri, L.R. Sharma and N.S. Pathania, Principles of Physical Chemistry Vishal Publishing Co. 41<sup>st</sup> Edition.
6. P.L. Soni & O.P. Dharmarha, Text Book of Physical Chemistry, Sultan Chand & Sons.

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**

**B.SC., - II & IV - SEMESTER – FIRST / SECOND ALLIED COURSE – III**  
**(FOR BOTANY, MATHEMATICS, PHYSICS & ZOOLOGY MAJOR)**  
 (For the candidates admitted from the year 2011 -12 onwards)

**ALLIED CHEMISTRY – III**

- UNIT- I (15 hours)** 1.1 Molecular Orbital theory: Basic concepts of M.O. theory – Bonding and antibonding orbitals – Bond order – Application of M.O. theory to  $H_2, He_2, N_2, O_2$  and  $F_2$  molecules.  
1.2 Compounds of Sulphur: Preparation, Properties, uses and structures of per acids of sulphur and sodium thio sulphate.
- UNIT –II (15 hours)** **Co-Ordination Chemistry:**  
Nomenclature of Mononuclear complexes – Werner, Sidgwick theories Chelation – Application and structure of EDTA – Biological role of haemoglobin and chlorophyll (Elementary idea)
- UNIT-III (15 hours)** 3.1 Electron displacement Effect: Inductive Effect – Definition – Relative strengths of aliphatic mono carboxylic acids and aliphatic amines  
3.2 Stereoisomerism: Optical isomerism – Optical activity – Chirality – Lactic and tartaric acids-racemic mixture- resolution. Geometrical isomerism – Maleic and fumaric acids.
- UNIT – IV (15 hours)** 4.1 Aromatic Hydrocarbons: Structure, Stability, Resonance and aromaticity of benzene. Electrophilic substitution reactions in benzene with mechanism – nitration, sulphonation, halogenation. Naphthalene – isolation, synthesis and properties  
4.2 Organic halogen Compounds: Chemistry of Chloroform, Carbon tetra chloride, DDT, BHC and Freon -1,2
- UNIT- V (15 hours)** 5.1 Surface Chemistry: Emulsions, Gels – Definition, Preparation, Properties and applications.  
5.2 Chromatography – Column, paper and thin layer chromatography.  
5.3 Catalysis-types, Mechanisms and industrial applications.

## Books Recommended:

1. P.L. Soni and Mohan kalyal “Text Book of Inorganic Chemistry” 20<sup>th</sup> Revised Edition, Sultan Chand 1992.
2. R.B. Puri and L.R. Sharma “Principles of Inorganic Chemistry” Sultan Chand 1989.
3. R.D. Madan “Modern inorganic Chemistry” S. Chand and Co.Pvt. Ltd., 1987 New Delhi.
4. P.L. Soni “Text Book of Inorganic Chemistry” ,Sultan Chand and Co., New Delhi.
5. B.S. Bahl and Arun Bahl ‘Advanced Organic Chemistry’ S.Chand and New Delhi.
6. B.R. Puri, L.R.Sharma and madan S.Pathania ‘Principles of Physical Chemistry’ Shoban Lal Nagin Chand and Co., Delhi.
7. P.L Soni “Text Book of Physical Chemistry” Sultan Chand and Co., new Delhi.

Sl. No.:

12P3/  
14P4

Subject Code:

U11CH2A2P/  
U11CH4A2P

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**

**B.SC., - II & IV - SEMESTER – FIRST ALLIED COURSE - I**  
**(FOR BOTANY, MATHEMATICS, PHYSICS & ZOOLOGY MAJOR)**  
(For the candidates admitted from the year 2011-12 onwards)

**VOLUMERTIC ANALYSIS PRACTICAL**

1. Acidimetry and alkalimetry
  - a) Strong acid Versus Strong Base
  - b) Weak acid Versus Strong base.
  - c) Determination of hardness of water
  
2. Permangnometry
  - a) Estimation of ferrous sulphate using  $\text{KMnO}_4$
  - b) Estimation of oxalic acid using  $\text{KMnO}_4$
  
3. Iodometry
  - a) Estimation of copper using thiosulphate
  - b) Estimation of  $\text{K}_2\text{Cr}_2\text{O}_7$
  - c) Estimation of  $\text{KMnO}_4$  using thiosulphate

**II ORGANIC ANALYSIS**

A study of reactions of the following organic compounds:

1. Carbohydrate
2. Amide
3. Aldehyde
4. Ketone
5. Acid
6. Amine
7. Phenol

The students may be trained to perform the specific reactions like

Test for element (nitrogen only)

Aliphatic or aromatic,

Saturated or unsaturated and functional group present and record their observation.

**CHAIRMAN – BOS**

**COE**

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**  
**B.Sc., CHEMISTRY - III SEMESTER – CORE COURSE - IV**  
 (For the candidates admitted from the year 2011-12 onwards)

**GENERAL CHEMISTRY- III**

**UNIT- I INORGANIC CHEMISTRY ( 15 hours )**

- 1.1 Principle of qualitative analysis Solubility Product principle of elimination of interfering radicals, common ion effect, complexation reactions including spot tests in qualitative analysis.
- 1.2 Nitrogen family : Comparative study of nitrogen family elements and their compounds (Oxides, Halides, Hydrides and Oxyacids).
- 1.3 Chemistry of hydrazine, hydrozoic acid, hydroxyl amine and sodium bismuthate.
- 1.4 Non aqueous solvents – classification – Liquid ammonia as solvent
- 1.5 Zero Group Elements  
Compounds of Xenon –  $\text{XeF}_2$ ,  $\text{XeF}_4$ ,  $\text{XeF}_6$ ,  $\text{XeO}_3$  and  $\text{XeOF}_4$  – preparation, properties, structure and uses.

**UNIT-II Metals and Metallurgy:**

- 2.1 Occurrence of metals – concentration of ores – froth floatation, magnetic separation, Calcination, roasting, Smelting, aluminothermic Process.
- 2.2 Purification of metals – electrolysis, Zone refining, vanArkel de Boer methods
- 2.3 Mineral Wealth of India – Important minerals found in India (Magnetite, Haematite, Pyrolusite, Bauxite, Magnesite, dolomite, Gypsum, ilmenite, Monazite, pitch blende, Mica, and Common Salt) Minerals exported from and imported to India.

**UNIT - III (Organic Chemistry) (15 hours)**

- 3.1 Conformational analysis of ethane and n-butane with energy diagrams. Conformation of cyclohexane (boat, chair and Skew – boat forms) – Axial and equatorial bonds ring flipping.
- 3.2 Aromatic hydrocarbons: Structure and Stability of benzene ring – resonance in benzene – delocalized pi – electron cloud in benzene.
- 3.3 Aromaticity: Huckel's rule with example like cyclopropenyl cation, benzene, naphthalene, anthracene, furan, thiophene, Pyridine, ferrocene and azulene

**UNIT – IV (Organic Chemistry) (15 Hrs)**

- 4.1 Electrophilic and Nucleophilic Substitution reactions in aromatic compounds.  
General mechanism of electrophilic substitution reaction – nitration, Sulphonation, halogenation, Friedel – Craft's alkylation and acylation reactions – Effect of Substituents – Activating and Deactivating groups Orientation effect.
- 4.2 Aromatic nucleophilic substitution reaction – Benzyne mechanism, Intermediate Complex formation mechanism.

**UNIT - V (Physical Chemistry) (15 Hrs)**

- 5.1 Heisenberg's uncertainty principle – Schrodinger wave equation – Eigen values and Eigen functions – Significance of  $\psi$  and  $\psi^2$  – Radial and angular distribution function. Concept of orbitals and Shapes of Orbitals.
- 5.2 V.B.Theory postulates – application to the formation of Simple molecules like hydrogen and helium. Overlap of atomic orbitals and principles of hybridization.
- 5.3 M.O.theory – bonding, antibonding molecular orbitals – MO diagrams of simple homonuclear diatomic molecules ( $\text{H}_2$ ,  $\text{H}_2^+$ ,  $\text{He}_2$ ,  $\text{He}_2^+$ ,  $\text{Li}_2$ ,  $\text{B}_2$ ,  $\text{C}_2$ ,  $\text{O}_2$ ,  $\text{N}_2$  and  $\text{F}_2$ ) and hetero nuclear diatomic molecules ( $\text{HF}$  and  $\text{CO}$ ).
- 5.4 Comparison of VB and MO Theories.

Books Recommended:

1. P.L.Soni and Mohan Katyal, "Text Book of Inorganic chemistry" 20<sup>th</sup> Revised Edition, Shoban Lal Nagin Chand & Co New Delhi.1993.
2. R.B.Pori and I.R.Sharma, K.C.Kaila, "Principle of Inorganic Chemistry" sultan Chand and Co New Delhi. 1992.
3. Vogel's "Text Book of qualitative Chemical Analysis" 6<sup>th</sup> Edition ELBS, Derling Kinderslay (India) Pvt Ltd New Delhi-2006.
4. R.D.Madan, "Modern Inorganic Chemistry", S.Chand & Co (Pvt) Ltd. New Delhi.1997
5. M.K.Jain, "Organic Chemistry", 12<sup>th</sup> Edition Shoban Lal Nagin chand and Co. New Delhi 1987.
6. P.L.Soni and H.M.Chawla, "Text Book of Organic Chemistry", 23<sup>rd</sup> Edition Sultan Chand Co. New Delhi 1990.
7. K.S.Tewari S.N.Mehrotra and N.K.Vishnoi, "A Text Book of Organic Chemistry", 3<sup>rd</sup> Edition, Vikas publishing House (Pvt) Ltd. New Delhi 2006.
8. R.K.Prasad, "Quantum Chemistry" New Age International (P) Ltd. Publishers 1996.
9. B.R.Puri, L.R.Sharma and Madan S.Pathania, 41<sup>st</sup> Edition, "Principle of Physical chemistry" Vishal Publishing. Co, New Delhi, 2004.



**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**  
**B.Sc., PHYSICS - III SEMESTER – NON-CORE ELECTIVE - I**  
(For the candidates admitted from the year 2011 -12 onwards)

**LABORATORY HYGIENE AND SAFETY**

- UNIT- I**  
**(6 hours)** 1.1 Laboratory safety measures: Lab discipline – Cleanliness and watchfulness. Maintenance of worktable, washing sink, fume hoods, fuel gas systems, instruments and equipments – Requirements for a safe laboratory. Use of apron overcoats, goggles gloves, etc.,
- UNIT –II**  
**(6 hours)** 2.1 Storage and handling of chemicals – carcinogenic chemicals – Handling of ethers – toxic and poisonous chemicals.
- UNIT-III**  
**(6 hours)** 3.1 Safe limits of vapour concentrations – Waste disposal and fume disposal – Precautions for avoiding accidents – cleansing agents – cleaning the apparatus and Instruments.
- UNIT – IV**  
**(6 hours)** 4.1 First – Aid techniques: Burns and Damages due to organic substances, acids, alkalis, burns in the eye- Inhalation of toxic vapours, hazardous chemicals, bromine, phenol and hot objects.
- UNIT- V**  
**(6 hours)** 5.1 Poisons and antidotes – Rules to avoid poisoning – emetics- universal antidote – treatments for specific poisons. Harmful effects of X-rays and lasers.

Books Recommended:

1. V.Gopalan, P.S.Subramaniam and K.Rengarajan, Elements of Analytical Chemistry.
2. Jayashree Ghosh, A Text Book of Pharmaceutical Chemistry.

CHAIRMAN – BOS

COE

Sl. No.: 14P3

Subject Code: U11CH4C5P

10

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS):: KARUR-05**

**B.Sc., CHEMISTRY - IV SEMESTER – CORE COURSE - V**

(For the candidates admitted from the year 2011-12 onwards)

**SEMI MICRO QUALITATIVE ANALYSIS PRACTICAL -II**

Analysis of a mixture containing two cations and two anions of which one will be an interfering.

CATIONS TO BE STUDIED: Lead, Copper, Bismuth, Cadmium, Iron, Aluminum, Zinc Manganese, Cobalt, Nickel, Barium, Calcium, Strontium, Magnesium and Ammonium.

ANIONS TO BE STUDIED: Carbonate, Sulphide, Sulphate, Nitrate, Chloride, Bromide, Fluoride, Borate, Oxalate and Phosphate.

Marks:

Int.Asst.	25
Practical	75
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Total	100
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**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05****B.Sc., CHEMISTRY - IV SEMESTER – CORE COURSE - VI**

(For the candidates admitted from the year 2011-12 onwards)

**GENERAL CHEMISTRY - IV****UNIT- I INORGANIC CHEMISTRY ( 15 hours )****Alkali and Alkaline earth metals.**

- 1.1 Comparative study of metal and alkaline earth metal compounds (Oxides, Halides, Hydrides, carbonates, and Sulphates).
- 1.2 Diagonal relationship between lithium and magnesium.
- 1.3 Preparation, Properties and uses of Lithium aluminium hydride and sodium borohydride. Coinage metals.
- 1.4 Comparative study of coinage metals and chemistry of photography. Zinc group metals.
- 1.5 Comparative study of Zinc group metals, Galvanisation, Evidences for the existence of mercurous ion as  $\text{Hg}_2^{2+}$

**UNIT-II Inorganic Chemistry****Inner Transition Elements**

- 2.1 Lanthanides – occurrence – general study of lanthanides involving electronic Configuration, Oxidation states, Magnetic properties and Complexation behaviour.
- 2.2 Actinides – Occurrence – electronic Configuration, Oxidation states, Magnetic properties and Complexation behaviour.
- 2.3 Chemistry of thorium and Uranium – Occurrence, Ores, extraction and uses.

**UNIT - III (Organic Chemistry) (15 hours)**

- 3.1 Grignard reagent – Preparation and Synthetic uses.
- 3.2 Aliphatic and nucleophilic substitutions – Mechanism of  $\text{SN}_1$ ,  $\text{SN}_2$ , and  $\text{SN}^i$  reactions and Effect of Solvents, leaving groups nucleophiles and Structure of substrates.
- 3.3 Elimination reaction – Hofmann and Saytzeff's eliminations Cis and Trans eliminations – Mechanism of  $\text{E}_1$  and  $\text{E}_2$  reactions.

**UNIT – IV (Organic Chemistry) (15 Hrs)**

- 4.1 Unsaturated alcohol – Alkyl alcohol – Preparation, Properties and uses.
- 4.2 Thio alcohols – Preparation, Properties and uses of ethyl mercaptan.
- 4.3 Ethers: Aliphatic and aromatic ethers – Preparation, properties and uses, 1,4 – dioxane and crown ethers – preparation, properties and uses, Epoxides – preparation reactions and applications.
- 4.4 Thio ethers – preparation and uses.

**UNIT - V (Physical Chemistry) (15 Hrs)****(Physical Chemistry) (15 Hrs)**

- 5.1 Polarization-Induced polarization- Orientation polarization
- 5.2 Determination of dipole moment by temperature method. Application of dipole moment measurements – in distinguishing between cis and trans isomers in determining the percent ionic character of bonds – Shapes of simple inorganic and organic molecules ( $\text{BCl}_3$ ,  $\text{H}_2\text{O}$ ,  $\text{CO}_2$ ,  $\text{NH}_3$ ,  $\text{CCl}_4$ ) Dipole moment of substituted benzene (o,m and p dichloro benzene )

## Books Recommended:

1. P.L.Soni and Mohan Katyal, "Text Book of Inorganic chemistry" 20<sup>th</sup> Revised Edition, Shoban Lal Nagin Chand & Co New Delhi.1993.
2. R.B.Puri and I.R.Sharma, K.C.Kaila, "Principle of Inorganic Chemistry" sultan Chand and Co New Delhi. 1992.
3. Vogel's "Text Book of qualitative Chemical Analysis" 6<sup>th</sup> Edition ELBS, Derling Kinderslay (India) Pvt Ltd New Delhi-2006.
4. R.D.Madan, "Modern Inorganic Chemistry", S.Chand & Co (Pvt) Ltd. New Delhi.1997
5. M.K.Jain, "Organic Chemistry", 12<sup>th</sup> Edition Shoban Lal Nagin chand and Co. New Delhi 1987.
6. P.L.Soni and H.M.Chawla, "Text Book of Organic Chemistry", 23<sup>rd</sup> Edition Sultan Chand Co. New Delhi 1990.
7. K.S.Tewari S.N.Mehrotra and N.K.Vishnoi, "A Text Book of Organic Chemistry", 3<sup>rd</sup> Edition, Vikas publishing House (Pvt) Ltd. New Delhi 2006.
8. B.R.Puri, L.R.Sharma and Madan S.Pathania, 41<sup>st</sup> Edition, "Principle of Physical chemistry" Vishal Publishing. Co, New Delhi, 2004.

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**  
**B.Sc., CHEMISTRY – IV SEMESTER –SKILL BASED ELECTIVE -I**

(For the candidates admitted from 2011-2012 onwards)

**LABORATORY HYGIENE AND SAFETY**

- UNIT- I**      1.2 Laboratory safety measures: Lab discipline – Cleanliness and  
**(6 hours)**      watchfulness. Maintenance of worktable, washing sink, fume hoods, fuel  
gas systems, instruments and equipments – Requirements for a safe  
laboratory. Use of apron overcoats, goggles gloves, etc.,
- UNIT –II**      2.1 Storage and handling of chemicals – carcinogenic chemicals – Handling of  
**(6 hours)**      ethers – toxic and poisonous chemicals.
- UNIT-III**      3.1 Safe limits of vapour concentrations – Waste disposal and fume disposal –  
**(6 hours)**      Precautions for avoiding accidents – cleansing agents – cleaning the  
apparatus and Instruments.
- UNIT – IV**      4.1 First – Aid techniques: Burns and Damages due to organic substances,  
**(6 hours)**      acids, alkalis, burns in the eye- Inhalation of toxic vapours, hazardous  
chemicals, bromine, phenol and hot objects.
- UNIT- V**      5.1 Poisons and antidotes – Rules to avoid poisoning – emetics- universal  
**(6 hours)**      antidote – treatments for specific poisons. Harmful effects of X-rays and  
lasers.

Books Recommended:

3. V.Gopalan, P.S.Subramaniam and K.Rengarajan, Elements of Analytical Chemistry.
4. Jayashree Ghosh, A Text Book of Pharmaceutical Chemistry.

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**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05****B.Sc., PHYSICS - IV SEMESTER – NON- CORE ELECTIVE - II**

(For the candidates admitted from the year 2011-12 onwards)

**WATER POLLUTION AND TREATMENT**

- UNIT- I (6 hours)** Water Pollution – Definition types of water pollution – Sources of water pollution – sewage and domestic wastes – their harmful effects – brief idea about sewage treatment – ISO parametas for drinking water.
- UNIT –II (6 hours)** Hardness of water and its types – disadvantages of hard water – softening – Zeolite process – ion exchange process – Water borne diseases like cholera, typhoid, Stone formation – Causes and remedies.
- UNIT-III (6 hours)** Chemical analysis of water – hardness (Ca&Mg) using EDTA method. Total Solids, dissolved oxygen, BOD, COD and TDS.
- UNIT – IV (6 hours)** Origin, Characteristics. Effects and treatment of effluents from Tannery and distillery industries.
- UNIT- V (6 hours)** Characteristics of Effluents from textile processing industry. Primary – treatment – Secondary treatment – Oxidation ponds and anaerobe digestion, Tertiary treatment – Evaporation, Reverse osmosis.

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**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05****B.Sc., CHEMISTRY - V SEMESTER – CORE COURSE - VII**

(For the candidates admitted from the year 2011-12 onwards)

**INORGANIC CHEMISTRY - I**

- UNIT- I Coordination compounds**  
 1.1 Types of ligands. IUPAC nomenclature  
 Theories of coordination compounds – Werner, Sidgwick, Valence bond, Crystal field, molecular orbital and ligand field theories.
- UNIT –II**  
 2.1. Isomerism – Stability of complexes – factors affecting the stability of complexes.  
 2.2 Unimolecular and bimolecular nucleophilic substitution reactions in octahedral and square complexes – Trans effect.  
 2.3 Application of coordination compounds – Determination of potassium ions, separation of copper cadmium ions, Estimation of nickel using DMG and aluminium using oxine.  
 2.4 Structure of EDTA and its complexes. Complexometric titrations - Principles and applications.
- UNIT-III**  
 3.1 Biologically important coordination compounds – Chlorophyll, haemoglobin, Vitamin B12 – Their structure, application (Elucidation is not required)  
 3.2 Metal carbonyls – Mono and poly nuclear carbonyls of Ni, Fe, Cr, Co and Mn – Synthesis, reactions, structure and uses.  
 3.3 Nitrosyl compounds – classification, preparation, properties and structure of nitrosyl chloride and sodium nitroprusside.
- UNIT – IV**  
 4.1 Binary compounds – hydrides, borides, carbides and nitrides – classification, preparation, properties and uses.  
 4.2 Organometallic compounds of alkenes alkynes and cyclopentadiene.
- UNIT - V 5.1 GRAVIMETRIC ANALYSIS**  
 Characteristics of precipitating agent – choice of precipitants – specific and selective precipitant.  
 Condition of precipitation. Types of precipitations. Purity of precipitant Coprecipitation and post precipitation. Precipitation from homogeneous solution. Digestion and washing of precipitate. Ignition of the precipitate. Use of sequestering agents.
- 5.2 GROUP THEORY AND ITS APPLICATIONS**  
 Symmetry elements – symmetry operation – mathematical group multiplication tables point group of simple molecules (H<sub>2</sub>, HCl, CO<sub>2</sub>, H<sub>2</sub>O, BF<sub>3</sub>, NH<sub>3</sub>)

**Books Recommended:**

1. P.L.Soni Text book of Inorganic Chemistry, S.Chand & Co., New Delhi(1999).
2. B.R.Puri and I.R.Sharma, "Principles of Inorganic Chemistry" shoban Lal, Nagin Chand &Co., New Delhi. 2000.
3. R.D.Madan, G.D.Tuli and S.M.Malik, Selected Topic in Inorganic Chemistry, S.Chand &Co., New Delhi (1988)
4. J.D.Lee., Concise Inorganic Chemistry, E.L.B.S., IV Edn, m(1991)
5. Jeffery et al."Vogel Text Book of Inorganic Quantitative Analysis", Longman (1984)
6. D.A.Skoog and D.M.West: "Fundamentals of Analytical Chemistry W.B.Saunders, New York (1983).
7. P.K.Bhattacharya: Chemical Application of Group Theory, Himalaya publishing House, Mumbai.(1998)
8. F.A.Cotton, Chemical Application of Group Theory, Third Edition, JohnWiley and Son , New York 2002.
9. M.S.Gopinath and V.Ramakrishnan: Group Theory and Applications (1988)
10. D.F.Shriver and P.W.Atkins, "Inorganic Chemistry " IIIrd Edition, Oxford University Press, 1999.
11. M.C. Day and Selbin, "Theoretical Inorganic Chemistry ", Second Edition; Affiliated East – West New Delhi, 1969..

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05****B.Sc., CHEMISTRY - V SEMESTER – CORE COURSE - VIII**

(For the candidates admitted from the year 2011-12 onwards)

**ORGANIC CHEMISTRY - I****UNIT- I STEREOCHEMISTRY - I**

1.1 Stereoisomerism – Definition – classification into optical and geometrical isomerism.

1.2 Optical isomerism – optical activity – optical specific rotation – conditions for optical activity. Asymmetric centre – chirality – archiral molecule – meaning of + and – and D and L notations – notation for optical isomers – Cahn – Ingold Prelog rules – R.S. notations for optical isomer with one asymmetric carbon. – Element of symmetry – Racemization – Methods of Racemization (by substitution and tautomerism) – symmetry- Resolution – Methods of resolution (Mechanical separation, seeding biochemical and conversion to diastereoisomers) – Walden inversion.

**UNIT –II STEREOCHEMISTRY - II**

2.1 Optical activity in compounds containing no asymmetric carbons – Biphenyls, Allenes and Spiranes.

2.2 Geometrical isomerism – Cis – Trans, Syn – Anti and E and Z notations Geometrical isomerism in Maleic and Fumaric acids in unsymmetrical ketoximes – Methods of distinguishing geometrical isomers (dipole moment, dehydration, heat of hydrogenation cyclization, melting points).

**UNIT-III REACTIONS OF CARBONYL COMPOUNDS**

3.1 Carbonyl polarization – Reactivity of carbonyl group – Acidity of alpha Hydrogen.

3.2 Mechanism of Perkin, Knoevenagel, Benzoin condensation. Reformatsky, and Wittig reactions.

3.3 Mechanisms of reduction ( Sodium borohydride,  $\text{LiAlH}_4$ , Wolff Kishner and MPV reductions) – Mechanisms of haloform reaction and Michael addition and Oppenauer oxidation.

3.4 Photochemistry of carbonyl compounds – Norrish I and II types.

**UNIT – IV ACIDS AND ACID DERIVATIVES**

4.1 Ionization of carboxylic acids – Acidity constant – comparison of acid strengths of substituted halo acids – Hammett equation.

4.2 Malonic and acetoacetic esters – Characteristics of reactive methylene group - Synthetic uses of Malonic and acetoacetic esters.

4.3 Tautomerism – Definition – Keto Enol tautomerism – identification – acid and bases catalyzed interconversion mechanism.

**UNIT - V HETEROCYCLIC COMPOUNDS**

5.1 Aromatic characteristics of heterocyclic compounds.

5.2 Preparation, properties and uses of Furan. Pyrole, Thiophene.

5.3 Synthesis and reactions of pyridine and Piperidine- comparative basic characters of pyrrole, pyridine and piperidine with amines.

5.4 Synthesis and reactions of Quinoline, Isoquinoline and Indole with special reference to Skraup, Bischler Napieralski and indole synthesis.

**Note :** Problems where possible (all units).

**Books Recommended:**

1. B.S.Bahl and Arun Bahl “Advanced Organic Chemistry” , S. Chand & Co, New Delhi. (1998)
2. P.L.Soni and H.M.Chwla: “Text book of Organic Chemistry: - 28<sup>th</sup> Edition (1999) – Sultan Chand , New Delhi.
3. RaviBhushan: “Stereoisomerism of carbon compounds” – CBS – Publishers, Delhi – Revised ed. (1998)
4. P.S.Kalsi: “Stereochemistry, Conformation and Mechanism” Willey Eastern Limited, New Delhi.
5. O.P.Agarwal : “Chemistry of Natural Products” Volume 1 & 2.
6. D.Nasipuri, “Stereochemistry of organic Compounds “ , Wily Eastern Ltd., New Delhi. (1992)
7. I.L.Finar, “Organic Chemistry” Volume 1, E.L.B.S., London, (1998).
8. Sheyan Egg, “Organic Chemistry Mechanisms,”
9. R.K.Bansal, “Organic Reaction Mechanism,” Tata Mc Graw Hill, 1975.
10. P.S.Kalsi, “Organic reaction and their Mechanism ,” New Age International Publishers.
11. S.H.Pine , J.B.Hendrickson, D.J.Cram and G.S Hammomd , “Organic Chemistry’ McGraw Hill fourth Edition, 1980.

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**  
**B.Sc., CHEMISTRY - V SEMESTER – CORE COURSE - IX**  
 (For the candidates admitted from the year 2011-12 onwards)

**PHYSICAL CHEMISTRY - I**

- UNIT- I**      **DEFINITION OF THERMODYNAMICS TERMS**      **15 hours**  
 Systems and surroundings- isolated, closed and open systems – Homogenous & heterogeneous systems, state of the system intensive and extensive variables. Thermodynamics process – cyclic processes, reversible and irreversible, isothermal and adiabatic processes – state and path functions, exact and inexact differentials, concepts of heat and work. Work of expansion constant pressure and free expansion.
- UNIT –II**      **FIRST LAW OF THERMODYNAMICS AND ITS APPLICATION**  
 2.1 First law of thermodynamics – statements, definitions of internal energy (U), enthalpy(H), heat capacity relation between  $C_p$  and  $C_v$ - calculation of  $W, Q, u$  and  $H$  for expansion of ideal and real gases under isothermal and adiabatic condition for reversible and irreversible processes.  
 2.2 Joule – Thompson effect, Joule – Thompson experiment. Relationship between  $\mu_{j,t}$  and other thermodynamic qualities. Calculation of  $\mu_{j,t}$  for ideal and gases. Joule – Thompson coefficient and inversion temperature. The zeroth law of thermodynamics – statement - Requirements of thermochemical equation – bond dissociation energy – its calculation from thermochemical data. Temperature dependence of Kirchoff's equation.
- UNIT-III**      **SECOND LAW OF THERMODYNAMICS AND ITS APPLICATIONS**  
 3.1 Heat engine – Carnot's cycle and its efficiency – Carnot's theorem – thermodynamic scale of temperature  
 CONCEPT OF ENTROPY: Entropy as a function of P, V and T. Entropy of mixing – Clausius inequality.  
 3.2 GIBBS AND HELMHOLTZ FUNCTIONS:  
 $A$  and  $G$  criteria for thermodynamics equilibrium and spontaneity – Gibbs – Helmholtz equations and their applications – Maxwell's relations. Equilibrium constants and free energy change. Thermodynamic derivation of law of mass action.  
 3.3 Equilibrium between different phases - system of variable composition – partial molar quantities – chemical potential of component in ideal mixture – Gibbs Duhem equation.  
 Reaction isotherm – Van't-Hoff's equation Van't - Hoff's isochore. Clapeyron equation and Clausius Clapeyron equation – applications.
- UNIT – IV**      **THIRD LAW OF THERMODYNAMICS AND ITS APPLICATIONS**  
 4.1 Need for the law, Nernst heat theorem, III law of thermodynamics – statement and concept of residual entropy. Evaluation of absolute entropy from heat capacity data.  
 4.2 Solutions – Ideal liquid mixtures –(benzene and toluene)-Raoult's law and Henry's law– Deviation from Raoult's law and Henry's law – Activity and activity Coefficient. Duhem-Margule's equation –its application to fractional distillation of binary miscible liquids.  
 4.4 Partially miscible liquid pairs – Phenol – Water, Triethanolamine Water and Nicotine-Water systems – Lower and upper CSTs Effect of impurities on CST.
- UNIT - V**      **PHASE RULE**  
 5.1. Meaning of the terms – phase, component and degree of freedom. Derivation of Gibb's phase rule. Phase equilibria of one component systems-water,  $CO_2$  and sulphur systems.  
 5.2 Reduced phase rule – phase equilibria of two component of systems – solid –liquid equilibria – simple eutectic systems –Bi-Cd and Pb-Ag Systems – Pattinson's process.  
 5.3 Compound formation with congruent melting points (Mg-Zn) and incongruent melting points – Efflorescence and Deliquescence.

**References:**

1. "Principles of physical chemistry", B.R.Puri & Sharma.
2. "Text book of Physical chemistry", P.L.Soni.
3. "Advanced Physical chemistry", GrudeeRaj.
4. "Essentials of Physical chemistry", B.S.Bahl., G.D.Tuli & Arun Bahl, S.chand & Co., N.Delhi (1999).
5. "Thermodynamics for chemistry", Samuel Glasstone.
6. "Simplified course in Physical chemistry", R.LMadan, G.D.Tuli, S.Chand & Co., N.Delhi (1999).
7. "Thermodynamics for students of chemistry", Rajaram and Kuriacose.
8. P.W.Atkins, "Physical Chemistry", ELBS, Oxford Univ. Press,1998.
9. R.A.Alberty and R.j.Silbay, "Physical Chemistry", John wiley sons. Inc. NewYork,1995.
10. Gordon. M.Barrow, "Physical Chemistry", Tata Mc Graw Hill, New Delhi.
11. I.N.Lerine, "Physical Chemistry"



**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**  
**B.Sc., CHEMISTRY - V SEMESTER ELECTIVE COURSE - I**  
(For the candidates admitted from 2011-2012 onwards)

**INDUSTRIAL CHEMISTRY**

- UNIT- I**  
**(6 hours)**
- 1.1 Cement: Manufacture Wet Process and Dry Process, Types, setting of cement, Reinforced concrete.
  - 1.2 Glass: Types, Composition, manufacture of Optical glass, coloured glasses and lead glass.
- UNIT –II**  
**(6 hours)**
- 2.1 Sugar: Cane Sugar manufacture, Recovery of sugar from molasses, Sugar estimation.
  - 2.2 Paints & Varnishes: Primary constituents of paints, dispersion medium (solvent), binder, Pigments, Oil based paints, latex paints baked on paints (alkydresins), formulation of paints and varnishes, Requirements of a good paint.
- UNIT-III**  
**(6 hours)**
- 3.1 Chemical Explosives: Origin of explosive, preparation and chemistry of lead azide, nitrocellulose, TNT, Dynamite, Cordite and gunpowder introduction to rocket propellants.
  - 3.2 Leather Industry: Curing, Preservation and tanning of hides and skins. Treatment of tannery effluents.
- UNIT – IV**  
**(6 hours)**
- 4.1 Petroleum: Origin, Refining, Cracking, Reforming knocking and octane number, LPG, synthetic petrol.
  - 4.2 Fuel Gases: Large scale production, Storage, Hazards and uses of coal gas, Wages gas, Producer gas, and Oil gas.
- UNIT- V**  
**(6 hours)**
- 5.1 Electrochemical Industries: Production of materials like chlorine, caustic soda and sodium chlorate.
  - 5.2 Electrolytic refining of aluminium, Electro-Oxidation and electro-reduction process with examples, Solar cells and fuel cells.

Books Recommended:

1. B.N.Chakrabarty, Industrial Chemistry, Oxford & IBH Publishing co, New Delhi, 1981.
2. B.K.Sharma, Industrial Chemistry, Goel Publishing House, Meerut.
3. P.P.Singh, T.M.Joseph, R.G.Dhavale, College Industrial Chemistry, Himalaya Publishing House, Bombay, 4<sup>th</sup> Ed., 1983.

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**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**  
**B.Sc., CHEMISTRY – V SEMESTER – Skill based Elective -II**  
(For the candidates admitted from 2011 -12 onwards)

**SPECTROSCOPY-I**

**UNIT I**

1.1 Definition of spectroscopy – Electromagnetic radiation, Electromagnetic spectrum, atomic and molecular spectroscopy (translational, rotational, vibrational and electronic) units.

**UNIT II**

2.1 UV- Visible spectroscopy- absorptions laws (Lambert's and Beer's Law)- theory of electronic transition- Absorption and intensity shifts- factors influencing  $\lambda_{max}$  and  $\lambda_{max}^-$  Instrumentation and applications.

**UNIT III**

3.1 IR- Introduction-molecular vibrations-vibrational frequency -number of fundamental vibrations- factors influencing vibrational frequencies – selection rules.

**UNIT IV**

4.1 IR instrumentation – finger print region- application of IR spectra (Hydro carbon, Aromatic hydro carbons, Halogen compounds, Alcohol, Aldehyde and Ketones, Amine, Amide, Acid, Esters, -NO<sub>2</sub> compounds)

**UNIT V**

5.1 Raman spectroscopy- Rayleigh and Raman effect-Scattering-Stokes and Anti stokes lines-Difference between Raman and IR-Vibration – Rotational Spectra –mutual exclusion principle of CO<sub>2</sub> and N<sub>2</sub>O.

Books Recommended:

1. G. Herzberg, "Atomic Spectra and Atomic Structure"
2. 1. William Kemp, Organic Spectroscopy, ELBS II Edition, Spectroscopy of organic compounds.
3. . P.S. Kalsi, Organic Spectroscopy, Wiley Eastern Ltd, Madras.
4. 5. C.N.Banwell, Fundamentals of molecular spectroscopy, McGraw Hill, New York,1966.
5. G. Herzberg, "Molecular Spectra and Molecular Structure I. Spectra of Diatomic Molecules"
6. G. Herzberg, "Molecular Spectra and Molecular Structure II. Infrared and Raman Spectra of Polyatomic Molecules"
7. G. Herzberg, "Molecular Spectra and Molecular Structure III. Electronic Spectra and Electronic Structure of Polyatomic Molecules"
8. G. M. Barrow, "Introduction to Molecular Spectroscopy"
9. J. G. Calvert and J. N. Pitts, Jr., "Photochemistry"
10. H. B. Dunford, "Elements of Diatomic Molecular Spectra"
11. R. N. Dixon, "Spectroscopy and Structure"
12. K.V.Raman "Spectroscopy and mathematics of Quantum Chemistry" in Print.
13. R.Chang "Basic Principles of Spectroscopy"

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**  
**B.Sc., CHEMISTRY – V SEMESTER – Skill based Elective -III**  
(For the candidates admitted from 2011 -12 onwards)

**SPECTROSCOPY-I I**

UNIT I- <sup>1</sup>H NMR Spectroscopy

1.1. NMR Spectroscopy-principle of nuclear magnetic resonance – basic instrumentation-number of signals-chemical shift- shielding and deshielding-spin-spin coupling and coupling constants-TMS as NMR standard.

UNIT II

2.1. Interpretation of NMR spectra of simple organic compounds such as Acetone, Anisole, Benzaldehyde, Ethyl acetate, Ethylamine, Ethyl Bromide, Toluene and ethyl alcohol .

UNIT III- ESR spectroscopy

3.1.E.S.R.Spectroscopy-condition-theory of esr spectra-hyperfine splitting-esr spectra of simple radicals CH<sub>3</sub>, CD<sub>3</sub>, Naphthalene radical ions only.

UNIT IV - Mass spectroscopy

4.1. Mass spectroscopy-Basic principles- instrumentation molecular ion peak, base peak, metastable peak, isotopic peak- their uses. Nitrogen rule- ring rule- fragmentation – ML rearrangement.

UNIT V

5.1. Interpretation of mass spectra of simple organic compounds such as Acetone, Anisole, Benzaldehyde, Ethyl acetate, Ethylamine, Ethyl Bromide and Toluene .

Books Recommended:

1. William Kemp, Organic Spectroscopy, ELBS II Edition, Spectroscopy of organic compounds.
2. P.S. Kalsi, Organic Spectroscopy, Wiley Eastern Ltd, Madras.
3. R.M. Silverstein, C.G. Bassler and Monsil, Spectrometric identification of organic compounds, John Wiley & Sons, New York.
4. William Kemp, NMR in Chemistry, Mac Millan, 1986.
5. A.Carrington, A.D. Melahlam, Introduction to Magnetic Resonance, Harper and Row, New York, 1967.
6. E.A.V.Ebsworth, David, W.H.Ranklin and Stephen Cradock, Structural methods in inorganic chemistry, Black well Scientific Publ., 1987.
7. R. Drago, Physical methods in chemistry, Reinhold, New York, 1968.
8. C.N.Banwell, Fundamentals of molecular spectroscopy, McGraw Hill, New York, 1966.
9. G.W.Ewing, Instrumental methods of chemical analysis, McGraw Hill Pub, 1975.
10. Douglas. A.Skoog, Principles of instrumental analysis, Saunders College Pub.Co, III Edn., 1985
12. K.V.Raman “Spectroscopy and mathematics of Quantum Chemistry” in Print.
13. R.Chang “Basic Principles of Spectroscopy”

Sl. No.: 16P3

Subject Code: U11CH6C10P

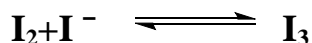
**GOVERNMENT ARTS COLLEGE (AUTONOMOUS):: KARUR-05****B.Sc., CHEMISTRY - VI SEMESTER – CORE COURSE – X**

(For the candidates admitted from the year 2011-12 onwards)

**PRACTICAL –III – PHYSICAL CHEMISTRY**

Distributive Law:

- Partition coefficient of Iodine between carbon tetrachloride and water.
- Equilibrium constant of the reactions.



Kinetics:

Acid catalysed hydrolysis of an ester (Methyl acetate or Ethyl acetate)

Molecular weight:

Rast's method: Naphthalene, m-dinitrobenzene and diphenyl as solvents.

Heterogeneous equilibrium:

- Critical solution temperature of phenol – water system-effect of impurity on C.S.T (2% NaCl or 2% succinic acid solutions).
- Simple eutectic system: Naphthalene – Biphenyl, Naphthalene Diphenylamine.
- Determination of transition temperature: Sodium acetate. Sodium thiosulphate.  $\text{SrCl}_2 \cdot 6\text{H}_2\text{O}$  &  $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$ .

Electro Chemistry:

- Conductivity : 1) Cell constant  
2) Equivalent conductivity  
3) Conductometric titrations
- Potentiometry: Potentiometric titrations.

Marks:

Int.Asst.	25
Practical	75
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Total	100
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CHAIRMAN – BOS

COE

Sl. No.: 16P4

Subject Code: U11CH6C11P

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS):: KARUR-05****B.Sc., CHEMISTRY - VI SEMESTER – CORE COURSE – XI**

(For the candidates admitted from the year 2011-12 onwards)

**PRACTICAL – IV - GRAVIMETRIC ANALYSIS AND ORGANIC COMPOUND ANALYSIS**

1. Preparation of involving oxidation, reduction, hydrolysis, nitration, sulphonation, halogenation diazotization.
2. Characterization of organic compounds by their functional groups and confirmation by preparation of derivatives.
3. Determination of melting and boiling points of simple organic compounds.

**GRAVIMETRIC ANALYSIS**

1. Estimation of calcium as calcium oxalate
2. Estimation of barium as barium sulphate
3. Estimation of barium as barium chromate
4. Estimation of lead as lead sulphate
5. Estimation of lead as lead chromate
6. Estimation of nickel as nickel dimethylglyoxime complex.

Marks:

Int.Asst.	25
Practical	75
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Total	100
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**CHAIRMAN – BOS****COE**

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**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**  
**B.Sc., CHEMISTRY - VI SEMESTER – CORE COURSE - XII**  
(For the candidates admitted from the year 2011-12 onwards)

**INORGANIC CHEMISTRY - II**

**UNIT- I NUCLEAR CHEMISTRY**

- 1.1 Introduction – Composition of nucleus and nuclear forces.
- 1.2 Nuclear stability – n/p ratio, mass defect, binding energy, packing fraction and magic numbers, shell and drop models.
- 1.2 Isotopes – detection and separation. Isotopic constitution of elements and whole number rule. Isobars, isotones and isomers.

**UNIT –II RADIOACTIVITY AND NUCLEAR TRANSFORMATIONS**

- 2.1 Radioactivity – discovery, detection and measurements ( Wilson cloud chamber). Disintegration theory – modes of decay – Group displacement law – Rate of disintegration – Half life and average life – Radioactive series.
- 2.2 Nuclear transformation – use of projectiles – nuclear reaction – fission and fusion. Nuclear reactors. Applications of radio isotopes – Carbon dating – Radio active waste disposal.
- 2.3 Radiolysis of water and hydrated electron

**UNIT-III METALLIC STATE**

- 3.1 Packing of atoms in metal (BCP, CCP, FCC, and HCP).
- 3.2 Theories of metallic bonding – electron gas, Pauling and band theories.
- 3.3 Structure of alloys – substitutional and interstitial solid solution – Hume Rothery ratios.

**UNIT – IV SOME SPECIAL CLASSES OF COMPOUNDS**

- 4.1 Clathrates – examples and structures. Interstitial compounds and non-stoichiometric compounds.
- 4.2 Metal alkyls, Co-ordination polymers and phosphonitrilic polymers.
- 4.3 Silicates – classification into discrete anions, one, two and three dimensional structures with typical examples composition, properties and uses of beryl, talc, mica, zeolites and ultramarines.

**UNIT- V**

- 5.1 Gaseous fuels – natural, gobar, coal, water, semi water and producer gases, liquefied petroleum gases(LPG).
- 5.2 Fertilisers – Manufacture of N.P.K and mixed fertilizers. Micronutrients and their role in plant life.
- 5.3 Safety matches fire works and explosive, paints and varnishes. (Elementary treatment only).

**Books Recommended:**

1. P.L.Soni, Mohan Katyal, “ Text book of Inorganic Chemistry”, 20<sup>th</sup> revised edn., Chand, 1992.
2. Esmarch S.Gilreath, “Fundamental concepts of Inorganic Chemistry”, International students edn. McGraw –Hill Kogakusha Ltd., 1958.
3. Gurdeep Chatwal, “Co-ordination Chemistry”, First edn., Himalaya Publishing House, 1992.
4. B.R.Puri and L.R.Sharma, “Principles of Inorganic Chemistry”, Shoban Lal Nagin Chand and Co., 1989.
5. O.P.Agarwal : “Chemistry of Natural Products” Volume 1 & 2.
6. R.D.Madan, “Modern Inorganic Chemistry”.
7. S.Glasstone, “Source Book on Atomic Energy”, 3<sup>rd</sup> edn., Affiliated East West Press, 1967.

Sl. No.: 1611

Subject Code: U11CH6C13

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**  
**B.Sc., CHEMISTRY - VI SEMESTER – CORE COURSE - XIII**  
 (For the candidates admitted from the year 2011-12 onwards)

**ORGANIC CHEMISTRY - II**

**UNIT- I PHENOLS, NITRO COMPOUNDS AND AMINES**

- 1.1 Cresols di and trihydric phenols, and naphthols – Preparation and Properties.
- 1.2 Conversion of nitrobenzene to ortho, para, and Meta dinitrobenzene.
- 1.3 Relative basic characters of Aliphatic and Aromatic amines.
- 1.3 Diazomethane and diazoacetic ester- preparation, structure and their synthetic uses.
- 1.4 Sulphanilic acid, Sulphanilamide, Saccharin, Chloramine – T- Preparation and uses.

**UNIT –II AMINO ACIDS AND PROTEINS**

- 2.1 Classification of amino acids. Essential and non- essential amino acids.
- 2.2 Preparation of L- Amino acids properties and reactions. Zwitter ions isoelectric points, peptide synthesis, structure determination of poly peptides. End group analysis.
- 2.3 Proteins – classification based on physical and chemical properties and based on physiological function primary and secondary structures of proteins. Helical and sheet structures (elementary treatment only) denaturation of proteins.
- 2.4 Type of nucleic acids – DNA and RNA biological functions.

**UNIT-III CARBOHYDRATES**

- 3.1 Mutarotation and its mechanism, cyclic structure, pyranose and furanose forms of glucose and fructose. Epimerization, chain lengthening and chain shortening of aldoses. Inter conversion of aldoses and ketoses. Haworth, Fisher and chair conformations of glucose.
- 3.2 Di and polysaccharides – reaction and structure of maltose, lactose, Sucrose, starch and cellulose.

**UNIT – IV NATURAL PRODUCTS**

- 4.1 Structural elucidations of menthol and Terpinol.
- 4.2 Alkaloids – general methods of isolation and structural determination of piperine and nicotine.
- 4.3 Vitamins – thiamine, riboflavin, pyridoxine and ascorbic acids occurrence and biological importance only.

**UNIT- V MOLECULAR REARRANGEMENT**

- 5.1 Pinacol – pinacolone rearrangement – Beckmann, Benzidine, Hoffmann, Curtius, benzylic acid rearrangement. Claisen (sigmatropic rearrangement) and para Claisen rearrangements. Cope and Oxycope rearrangements, Fries rearrangement. (Mechanism only).

Books Recommended:

1. P.L.Soni, and H.M.Chawala, “Text Book of Organic Chemistry”, 27<sup>th</sup> edn. Sultan Chand 1997.
2. V.S.Parmar and H.M.Chawala, “Principles of Reaction Mechanism in Organic Chemistry o”, 2<sup>nd</sup> Edn., Sultan Chand 1978.
3. Subash Chandra Rastogi, Satis kumar Agarwala Ashok Sharma, “Chemistry of Natural Products” Vol.I & Vol.II Edition !974-75. Jai Prakash Nath & Co. Leading Educational Publishers.
4. Ernest L.Eliel “Stereochemistry of Carbon Chemistry”, 19<sup>th</sup> Reprint 1995 Tata McGraw Hill Publishing company Ltd.
5. M.K.Jain “Organic Chemistry”, 12<sup>th</sup> Edn., Shoban Lal Nagin Chand and Co.

Sl. No.: 1612

Subject Code: U11CH6E2

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**  
**B.Sc., CHEMISTRY - VI SEMESTER – ELECTIVE COURSE - II**  
 (For the candidates admitted from the year 2011-12 onwards)

**ANALYTICAL CHEMISTRY**

- UNIT- I** 1.1 DATA ANALYSIS  
 Errors in chemical analysis, Classification of errors, Determine errors, Instrumental errors, Personal errors, constant errors and proportional errors – Correction of determinate errors Random errors, Precision, Accuracy and rejection of data questioned. Significant figures, Mean deviation and standard deviation. Curve fitting. Method of least squares.
- 1.2 ORGANIC ESTIMATIONS  
 Principles and methods to estimate glucose, ascorbic acid, Phenol. Aniline, Ketone, Oils and fats, Iodine value, Saponification value R.M.value and Acetyl value.
- UNIT –II** CHROMATOGRAPHY  
 2.1 Principles involved in adsorption, Partition and ion exchange, paper, Thin Layer, Column, Gas Liquid chromatography. Electro-phoresis- Applications.  
 2.2 Desiccants, Vacuum drying, Distillation, fractional Distillation, Stem Distillation, Azeotropic Distillation, Crystallisation and Sublimation – Principles and Techniques.
- UNIT-III** THERMOANALYTICAL METHODS  
 3.1 Principles involved in thermo gravimetric analysis and differential thermal analysis – instrumentation.  
 Characteristics of TGA ( $\text{CaC}_2\text{O}_4$ ,  $\text{H}_2\text{O}$ ,  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  and DTA curves – ( $\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$ ) factors affecting TGA and DTA curves.  
 3.2 Thermometric Titration of HCl Vs NaOH.  
 3.3 ANALYTICAL ELECTROCHEMISTRY  
 Electrolytic Separation. Principles of electrodeposition. Electro-Gravimetry (Estimation of Copper and Silver).
- UNIT – IV** COLORIMETRIC ANALYSIS  
 4.1 Laws of Colorimetry – Nessler’s and Photo electric colorimetric method – operation and applications. Estimation of Ni, Cu and Fe.  
 4.2 Basic principles of flame photometry – Atomic absorption – Spectrophotometry- Estimation of Na, K and Ca.  
 4.3 TECHNIQUES IN KINETICS  
 Principles and techniques used to follow the kinetics of ordinary and fast Photo chemical reactions.
- UNIT - V** ELECTRO ANALYTICAL METHOD  
 5.1 Polarography- principle, concentration polarization, dropping mercury electrode (DME) –advantages and disadvantages-migration, residual, limiting and diffusion current- use of supporting electrolytes- Ilkovic equation (derivation not required) significance- experimental assembly-current voltage curve- oxygen wave- influence of temperature and agitation on diffusion layer. Half wave potential ( $E_{1/2}$ ) – polarography an analytical tool in qualitative and quantitative analysis.  
 5.2 Polarimeter – principle - specific rotation – instrumentation-applications.

**Books Recommended:**

01. R.Gopalan, P.S. Subramaniam and K.R. Rengarajan: “Elements of Analytical Chemistry”, “sultan chand & Sons, New Delhi (1995).
02. B.K.Sharma: Instrumental Methods of Chemical Analysis, Goel Publishing House, Meerut(1999)
03. S.M.Khopkar: Basic Concepts of Analytical Chemistry, New Age International(P) Limited, New Delhi(1998)
04. Gurdeep Chatwal, Sham Anand: Instrumental Methods of Chemical Analysis, Himalaya Publishing House, Mumbai(1998)
05. R.A.Day and A.L.Underwood. :Quantitative Analysis”, Prentice Hall of India, New Delhi(1998)
06. D.A.Skoog & D.M. West: Fundamentals of Analytical Chemistry W.B.Saunders, New York (1982)
07. K.V. Raman: Computers in Chemistry Tata MC Graw Hill Co., New Delhi(1993)
08. B.G.Gottfried: BASIC Programming Mc Graw Hill International Ltd., (1980)
09. B.R.Gottfried: C Language Programming Mc Graw Hill International Ltd., (1987)
10. E.Balagurusamy: C Language Tata MC Graw Hill Co., New Delhi(1997)
11. A.I.Vogel, Text Book of Quantitative Inorganic Analysis Longman (1984).



**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05**  
**B.Sc., CHEMISTRY - VI SEMESTER – ELECTIVE COURSE - III**

(For the candidates admitted from the year 2011-12 onwards)

**PHYSICAL CHEMISTRY – II**

**UNIT-I ELECTRICAL CONDUCTANCE**

- 1.1 Elementary treatment of Debye- Huckel Onsager equation for strong electrolytes. Evidence for ionic atmosphere. The conductance at high field (Wein effect) and high frequencies (Debye – Falkenhagen effect). Transport number and Hittorf's rule – determination by Hittorf's method and moving boundary method
- 1.2 Determination of  $K_a$  of acids. Determination of solubility product of a sparingly soluble salt. Conductometric titrations.

**UNIT – II**

- 2.1 Electromotive force of a cell and its measurements. Computation of cell e.m.f. calculation of thermodynamic quantities of cell reactions. ( $G$ ,  $H$ ,  $S$  and  $K$ ). applications of Gibbs Helmholtz equation, concentration and E.M.F. Nernst equation.
- 2.2 Types of reversible electrodes – Gas/metal ion, metal/metal ion, metal/insoluble salt/anion and Redox electrodes. Electro reactions. Nernst equation – derivation of cell E.M.F. and single electrode potentials. Standard hydrogen electrode – reference electrodes – standard electrode potentials – Sign conventions – Electrochemicals series and its significance.
- 2.3 Concentration cells with and without transport. Liquid junction potential. Application of concentration cells – Valency of ions, solubility product and activity co-efficient, potentiometric titrations. Determination of pH using hydrogen, quinhydrone and glass electrodes.

**UNIT– III**

- 3.1 Derivation of rate constant of a second order reaction-when the reactants are taken at different initial concentrations-when the reactants are taken at the same initial concentrations-Determination of the rate constant of a II order reaction-Derivation of rate constant of a third order reaction-when the reactants are taken at the same initial concentrations. Derivation of half-life periods for second and third order reactions having equal initial concentration of reactants
- 3.2 Methods of determining the order of reaction- Experimental methods in the study of kinetics-volumetry, manometry, polarimetry and colorimetry
- 3.3 Effect of temperature on reaction rates-Derivation of Arrhenius equation-concept of activation energy-determination of Arrhenius frequency factor and energy of activation

**UNIT -IV**

- 4.1. Collision theory of reaction rates-Derivation of rate constant of a bimolecular reaction from collision theory-Failures of CT
- 4.2. Lindemann theory of Unimolecular reactions.
- 4.3. Theory of Absolute Reaction Rates-Thermodynamic derivation of rate constant for a bimolecular reaction based on ARRTcomparison between ARRT and CT. Significance of free energy of activation and entropy of activation.
- 4.4. Kinetics of complex reactions of first order opposing, consecutive and parallel reactions-examples with mechanism

**UNIT – V**

**5. Photochemistry**

- 5.1. Consequences of light absorption-The Jablonski diagramnon radiative transitions-radiative transitions-Grotthus-Draper law- The Stark Einstein law of photochemical equivalence-Quantum efficiency (quantum yield).
- 5.2. Energy transfer in photochemical reactionsphotosensitisation- Photosynthesis in plants-Chemiluminescence - fluorescence and phosphorescence-lasers-uses of lasers.
- 5.3. Photochemical reactions-Kinetics of hydrogen-bromine reaction-decomposition of HI – Photolysis of aldehydes and ketones(Mechanism only )

**Books Recommended:**

1. “Principles of physical chemistry “,B.R.Puri & Sharma.
2. R.P.Varma & Pradeep . “Physical Chemistry”
3. Dr. S.Jain & S.P.Jakkar, “Physical Chemistry, principles & problems” , Tata McGraw Hill, New Delhi, 1990.
4. Glasstone S., Lewis D.,Elements of Physical Chemistry, London, Mac Millan & Co. Ltd.
5. Atkins P.W., Physical Chemistry, (5<sup>th</sup> edition) Oxofrd University Press (1994)