



SAIVA BHANU KSHATRIYA COLLEGE

(Aruppukottai Nadargal Uravinmurai Pothu Abiviruthi Trustukku Pathiyapattathu)

(Affiliated to Madurai Kamaraj university)

(Re-accredited with B+ Grade (3rd Cycle) by NAAC)

ARUPPUKOTTAI - 626 101

VIRUDHUNAGAR DISTRICT, TAMIL NADU

DEPARTMENT OF CHEMISTRY

SYLLABUS

B.Sc., Chemistry

Year: First Year

Semester: II

CORE SUBJECT PAPERS

Core Subject	Semester	Subject / Title of the Paper
CS1	I	General Chemistry
CS2	II	Organic Chemistry I
CS3	III	Physical Chemistry I
CS4	IV	Inorganic Chemistry
CS5	V	Organic Chemistry II
CS6	V	Physical Chemistry II
CS7	V	Inorganic, Analytical and Applications of Computers in Chemistry
CS8	VI	Organic Chemistry III
CS9	VI	Physical Chemistry III
CS10	VI	Applied Chemistry

Semester	Part	Course	Title	Hours/ Week	Credits
II	I	Language-II		6	3
		Tamil/Other Lang.			
	II	English-II		6	3
	III	Core Course-II	Organic Chemistry-I	4	4
		Core practical-I	Volumetric Analysis	2	2
		Allied course -I*		6	5
	IV	Skill Based -III	Perfumes and Cosmetics	2	2
		Skill Based-IV	Leather and Textile Chemistry	2	2
		Non-Major Elective-II		2	2
TOTAL				30	23



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II Semester Core Paper –II

Objectives

1. To learn preparation and reactions of alkenes and alkynes
2. To study aromaticity and mechanism of certain reactions
3. To understand the chemistry of polynuclear hydrocarbons
4. To learn the preparation and reactions of halide based functional groups.
5. To learn the concept of stereochemistry

UNIT I: ALKENES AND ALKYNES

- a. Preparation of alkenes: dehydration of alcohols, dehydrohalogenation of alkyl halides, Saytzeff rules, partial dehydrogenation of alkynes. Reactions: addition of HX (Markownikoff's rule and anti Markownikoff's rule), ozonolysis, addition of halogen (mechanism of electrophilic addition), oxidation with Bayer's reagent, hydroboration.
- b. Dienes: conjugated, isolated and cumulative dienes with example, preparation from alkenes, reactions: Diels-Alder reaction and polymerization.
- c. Alkynes: preparation: Acetylene from CaC_2 , dehalogenation of tetra halides and Dehydro halogenation of vicinal-dihalides. Reactions: formation of acetylides, ozonolysis, oxidation reactions and addition of bromine.

UNIT II: AROMATIC HYDROCARBONS

- a. Aromaticity, Huckel's rule, Structure of benzene (M.O model)
- b. Preparation of benzene from phenol, acetylene and by decarboxylation. Reactions: Electrophilic substitution reaction- mechanism of nitration, sulphonation, halogenations, Friedel-Crafts alkylation and acylation
- c. Directive influence of substituents based on electronic effects.
- d. Preparation of toluene, xylene, and mesitylene

UNIT III: POLY NUCLEAR HYDROCARBONS, CYCLOALKANES AND CONFORMATION

- a. Preparations and reactions of biphenyl, naphthalene, anthracene and phenanthrene
- b. Cyclo alkanes: Preparation using Dickmann's method, Freund's method and reduction of hydrocarbons
- c. Bayer's strain theory and theory of strain less rings
- d. Conformational Analysis: Fischer, Saw-horse and Newman projection formula- Difference between configuration and conformation
- e. Conformational analysis of ethane, n-butane, 1,2-dichloroethane, cyclohexane and mono substituted cyclohexane



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UNIT IV: ALKYL AND ARYL HALIDES

- Alkyl halides: Preparation from alkenes and alcohols, Reactions: Types of nucleophilic Substitution reactions (S_N^1 , S_N^2 mechanism), hydrolysis, alkyl nitrate and nitroalkane-preparation, reaction with ammonia, elimination reactions (E_1 and E_2 mechanism).
- Aryl halides; Preparation from phenol, Sandmeyer's reaction, substitution by OH-Group (nucleophilic bimolecular mechanism) and by NH_2 group (Benzyne mechanism)
- Poly halogen derivatives: Preparation and applications of Westron and Freon

UNIT V: STEREO CHEMISTRY

- Geometrical Isomerism: Maleic acid and fumaric acids, aldoximes and ketoximes, Determination of configuration of geometrical isomers, E-Z notation.
- Optical activity, specific rotation, asymmetric centre, chirality, achiral molecules, Elements of symmetry, resolution of racemic mixtures, Walden inversion,
- Asymmetry synthesis, specification of R-S notations. Optically activity of compounds without asymmetric carbon atoms: Allenes, spirenes and biphenyl compounds

TEXT BOOKS

- A. Bahl and B.S. Bahl, Advanced Organic Chemistry, 1st Multicolour Edition, S. Chand & Company, New Delhi, 2010.
- S.C. Sharma and M.K. Jain, Modern Organic Chemistry, Vishal Publishing Company, New Delhi, 2014.
- K.S. Tewari, N.K. Vishnoi and S.N. Mehrotra, A Textbook of Organic Chemistry, 2nd Edition, Vikas Publishing House (Pvt.) Ltd., New Delhi, 2004.

REFERENCE BOOKS

- Jerry March, Advanced Organic Chemistry, 5th Edition, John Wiley and Sons, New York, 2004
- I.L. Finar, Organic Chemistry Vol. I, 6th Edition, Pearson Education, New Delhi, 2014.
- E.L. Eliel, Stereochemistry of Carbon Compounds, Tata McGraw Hill Publishing Company Ltd, New Delhi, 1992.



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Part IV: Skill based course - III

PERFUMES AND COSMETICS

Credits –2

Hours/Week: 2

Max. Marks 100

Ext: 75 + Int: 25

UNIT I: NATURAL PERFUMES

Perfumes –plant and animal sources– examples –components of perfume – vehicle – characteristics of good vehicle -fixatives and its types, odoriferous compounds, extraction of essential oils by distillation, enfleurage and solvent extraction methods.

UNIT II : ARTIFICIAL PERFUMES AND FLAVORS

Preparation and uses of methyl anthranilate, methyl salicylate, methyl cinnamate, phenyl ethanol, citronellol, vanillin, coumarin and heliotrope.

UNIT III: COMPOSITION AND MANUFACTURE OF PERFUMERY COMPOUNDS

Rose and Jasmine – Composition and preparation of rose and jasmine perfumes –manufacture of fruit flavors – fruit syrup preparation and composition of apple and pineapple flavors.

UNIT IV: SOAPS AND DETERGENTS

Cleansing action of soap – differences between soap and detergents – ingredients of washing and bathing soap – TFM of bathing soap – composition of solid and liquid detergents – functions of ingredients in detergents.

UNIT V: COSMETICS AND PERSONAL HYGIENE PRODUCTS

Characteristics of good cosmetics – demerits of artificial cosmetics –basic composition of talcum powder – face cream – nail polish – hair dye – toothpaste – mouthwash (Composition only)

REFERENCE BOOKS

1. Industrial Chemistry – B. K Sharma
2. Textbook of cosmetics – Rajesh Kumar Nema, Kamal Singh Rathore, Balkrishna Dubey
3. Manufacture of perfumes, cosmetics, detergents –Gir Raj Prasad (from Small Industry research Institute)



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DEPARTMENT OF CHEMISTRY

Part IV: Skill based course -IV

LEATHER AND TEXTILE CHEMISTRY

Credits –2

Max. Marks 100

Hours/Week: 2

Ext: 75 + Int: 25

UNIT I: INTRODUCTION

Structure and composition of animal skin-Terminology involved in leather tanneries- chemistry of beam house processes-soaking, liming, unhairing, deliming, bating and pickling-preservation of animal skin-salt curing and brine curing.

UNIT II: MATERIALS AND METHODS OF TANNING

Vegetable tans- catechol tans- pyrogallol tans-vegetable tanning process and applications of vegetable tanned leather-Chrome tanning-chemicals used-method-type of leather obtained and its uses-aldehyde tanning- Artificial leather- Corfam-synthetic tans

UNIT III: POLLUTION AND TREATMENT OF TANNERY EFFLUENT

Various finishing process in tanneries – drying - bleaching - fat liquoring - dyeing- calendaring. Pollution caused by leather tanneries-Treatment of tannery effluents-primary, secondary and tertiary treatment.

UNIT IV: TEXTILE FIBRES

Classification of textile fibres - differences between cellulosic and synthetic fibres - identification of fibres by burning and solubility tests - chemical structure, physical and chemical properties of cotton, wool, silk - chemical structure - physical and chemical properties of cotton, wool, silk

UNIT V: BLEACHING, DYEING & FINISHING

Bleaching of cotton fabrics - peroxide bleaching - hypochlorite bleaching - dyeing of cotton with vat dyes -dyeing of wool with acid dyes - dyeing of polyester with disperse dyes - textile finishing - mercerization - water repellent and waterproof finish.

REFERENCE BOOKS

1. Textile fibres - R. S.Prayag
2. Industrial Chemistry - B. K Sharma GOEL publishing
3. Technology and Textile Finishing - V. A. Shenai
4. Fundamental concepts of Applied Chemistry by Jayashree Ghosh, S. Chand &Company



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Part IV: Non-Major Elective - II

DRUGS AND COSMETICS

Credits-2

Max. Marks 100

Hours/Week:2

Ext: 75 + Int: 25

UNIT I

Significance of drugs - lethal dosage - bacteria - types of bacteria - gram positive - gram negative - examples - viruses - differences between bacteria and virus - fungi - drawbacks of drugs.

UNIT II

Analgesics - types - narcotic and non-narcotic analgesics - salicylate - ibuprofen (structure not necessary) antipyretics - paracetamol (structure not necessary). Vitamins - types - functions of A, B6, B12, C, D, E vitamins only (structure not necessary).

UNIT III

Antibiotics - types - broad and narrow spectrum antibiotics - tetracycline - rifomycin only (structure not necessary) - mechanism of drug action (PABA) - antimalarial drugs - quinine only (structure not necessary).

UNIT IV

Preparation of washing powder - cleaning powder - white, black, yellow colored phenoyls.

UNIT V

Characteristics of good cosmetics – demerits of artificial cosmetics - preparation shampoo, bathing soap, basic composition of face powder.

REFERENCE BOOKS

1. Pharmaceutical Chemistry - Lakshmi
2. Medicinal Chemistry - Gurdeep R. Chatwal
3. Medicinal Chemistry - Albert Burger
4. Textbook of cosmetics – Rajesh Kumar Nema, Kamal Singh Rathore, Balkrishna Dubey



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PRACTICAL - I

VOLUMETRIC ANALYSIS

(Examination at the end of II semester)

Credits –2

Max. Marks 100

Hours/Week: 2

Ext: 75 + Int: 25

Objectives

1. To enable the students to acquire the quantitative skills in volumetric analysis.
2. At the end of the course, the students should be able to plan experimental projects and execute them.

I ACIDIMETRY AND ALKALIMETRY

1. Estimation of HCl.
2. Estimation of oxalic acid.
3. Estimation of sodium carbonate
4. Estimation of sodium hydroxide

II REDOX TITRATIONS

A. PERMANGANOMETRY

1. Estimation of Ferrous ion
2. Estimation of oxalic acid

B. DICHROMETRY

1. Estimation of ferrous ion
2. Estimation of ferric ion using external indicator

III IODOMETRY AND IODIMETRY

1. Estimation of potassium dichromate
2. Estimation of potassium permanganate
3. Estimation of copper sulphate
4. Estimation arseneous oxide

IV ARGENTIMETRY

1. Estimation of potassium chloride

V COMPLEXOMETRIC

TITRATION

- a. Estimation of hardness of water using EDTA (demonstration only)



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Scheme of evaluation (Max. marks 100)

Internal Assessment 40 Marks

Regularity	20 Marks
Class Test	15 Marks
Observation Note	5 Marks
Total	40 Marks

External Examination: 60 Marks (3 hours)

Record Note Book	10 Marks
Procedure	15 Marks
Estimation	35 Marks
Total	60 Marks
< 3 %	35 Marks
3 - 4%	25 Marks
4- 5%	20 Marks
> 5%	10 Marks