



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: III

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	
III	I	Language-III Tamil/Other Lang.		6	3	
	II	English-III		6	3	
	III	Core Course-III	Physical Chemistry-I		4	4
		Core practical-II	Inorganic Semi micro Analysis		2	
		Allied course -I*			6	4
		Allied course II*			6	4
TOTAL				30	18	



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III SEMESTER CORE PAPER –III PHYSICAL CHEMISTRY I

Credits –4

Max. Marks 100

Hours/Week: 4

Ext: 75 + Int: 25

OBJECTIVES

1. To understand the properties of matter
2. To know the structure and types of solids
3. To learn the characteristics and applications of colloids
4. To understand the principles of adsorption and catalysis
5. To learn about electrical conductance and ionic equilibria.

UNIT I: PROPERTIES OF MATTER

- a. Intermolecular forces in liquids-Trouton's rule and significance- Surface tension and Viscosity of a liquid and Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only)
- b. Electrical properties: dipole moment -electrical polarization of dielectrics and polarisability –Applications of dipole moment studies - estimation of ionic character, calculation of bond moments, distinguishing geometrical isomers and o-, m-, p- isomers
- c. Magnetic properties: Magnetic permeability, specific susceptibility, atomic and molar susceptibilities – dia-, para- and ferromagnetism – measurement of susceptibility by Gouy's method

UNIT II: SOLID STATE

- a. Types of solids. Symmetry in crystals, unit cells, crystal systems, Bravais lattice types and identification of lattice planes. Laws of Crystallography - Law of constancy of interfacial angles, Law of rational indices. Miller indices.
- b. X-Ray diffraction by crystals, Bragg's law- determination of crystal structure – rotating crystal method- powder method- Structures of NaCl, KCl and CsCl (qualitative treatment only). Types of crystals-structure of diamond, graphite and ice. Frankel and Schotky defects in crystals.
- c. Liquid crystals – theory and applications.

UNIT III: COLLOIDAL STATE

- a. Colloids -Distinguishing characteristics of colloids, suspensions and solutions-Types of colloidal dispersions
- b. Optical properties-Tyndall effect– Kinetic properties – Brownian motion-Electrical properties–Helmholtz and diffuse double layers – electro kinetic or zeta potential – electrophoresis and its applications
- c. Coagulation – methods of coagulation – Hardy Schultz law – Hofmeister series - Protective colloids – protective action – gold number – applications- Emulsions – classification, preparation, identification Gels – preparation – properties (thixotropy, syneresis and imbibition)

UNIT IV: CATALYSIS AND ADSORPTION

- a. Catalysis- characteristics- - different types-homogeneous-heterogeneous-acid-base catalysis-auto catalysis-theories of catalysis-intermediate compound formation theory and adsorption theory- kinetics of enzyme catalysis - Michaelis Menton equation. –



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applications of catalysis

- b. Adsorption-definition-adsorbent-adsorbate-examples-difference between adsorption and absorption- factors influencing adsorption of gases on solids- physisorption and chemisorptions- - Langmuir adsorption isotherm –Applications of adsorption.

UNIT V: IONIC EQUILIBRIA

- a. Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes. Kohlrausch law of independent migration of ions.
- b. Transference number and its experimental determination using Hittorf method. Ionic mobility.
- c. Applications of conductance measurements: determination of degree of ionization of weak electrolyte, solubility and solubility products of sparingly soluble salts, ionic product of water, hydrolysis constant of a salt.
- d. Debye Huckle Onsegar theory.
- e. Conductometric titrations (only acid- base).

TEXT BOOKS

1. B.R. Puri, L.R. Sharma and M.S. Pathania, Principles of Physical Chemistry, 46th Edition, Vishal Publishing Company, New Delhi, 2013.
2. P.L. Soni, O.P. Dharmarha and U.N. Dash, Textbook of Physical Chemistry, 23rd Edition, Sultan Chand & Sons, New Delhi, 2011.

REFERENCE BOOKS

1. S. Glasstone and D.H. Lewis, Elements of Physical Chemistry, 2nd Edition, Macmillan & Company, UK, 1962.
2. W.J. Moore, Physical Chemistry, 5th Edition, Orient Longman, London, 1999.



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PRACTICAL - II

INORGANIC SEMI MICRO QUALITATIVE ANALYSIS

(Examination at the end of IV semester)

Credits –2
Max. Marks 100

Hours/Week: 2
Ext: 75 + Int: 25

Objectives

1. To enable the students to develop analytical skills in inorganic qualitative analysis.
2. To appreciate the various colored chemical reactions of metal ions.

Semi micro qualitative analysis:

1. Training sessions for three classes: Mixture of anions containing an interfering anion and its elimination technique. Mixture of cations of simple radicals to familiarize with the inter group separation techniques.
2. Semi micro qualitative analysis of inorganic salt mixtures containing two anions (one interfering) and two cations.
3. Simple anions: carbonate, nitrate, sulphate, sulphide, sulphite, chloride and bromide.
4. Interfering anions: borate, fluoride, oxalate, phosphate, arsenite and chromate.
5. Cations:
 - a. Group I cations: lead
 - b. Group II cations: lead, copper, cadmium, bismuth, antimony and tin.
 - c. Group III cations: aluminium, ferrous, ferric and chromium.

 - d. Group IV cations: cobalt, nickel, manganese and zinc.
 - e. Group V cations: barium, strontium and calcium
 - f. Group VI cations: magnesium and ammonium.

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
Reporting 4 ions with procedure 4 x 12.5	50 Marks