

DEPARTMENT OF CHEMISTRY

SRI RAMAKRISHNA MISSION

VIDYALAYA COLLEGE OF ARTS AND

SCIENCE COIMBATORE-641020

(An Autonomous College Affiliated to Bharathiar University & Re-Accredited by
NAAC with 'A' Grade)



OFFERS

VALUE ADDED COURSE
**CHEMISTRY FOR COMPETITIVE
EXAMINATIONS**

(2019-2020)

IMPORTANT DATES

- ❖ Commencement of the course: 02.07.2019
- ❖ Last date for Registration:01.07.2019

ELIGIBLE CANDIDATES:

Final year UG and PG students.

GENERAL INSTRUCTIONS

- Classes will be conducted in off – calendar hours
- Course fee including Examination fee : **Rs.1200/=**
- The duration of the course – 60 Hours
- Minimum attendance 75% is mandatory to attend both theory and practical Examinations.
- On successful completion of the course certificate will be provided.

Contact details:

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**The world is the great gymnasium where
we come to make ourselves strong**

**Sri Ramakrishna Mission Vidyalaya College of Arts and Science
Coimbatore – 641 020.**

**Department of Chemistry
Chemistry for competitive examinations**

Objectives:

- ❖ To motivate students for prospective career in Government and Corporate Sector.
- ❖ To provide guidance in various examinations such as IIT-JAM, UPSC, SSC. Defence services, Banks, Railways, Public sectors and corporate etc.
- ❖ To provide students with some insight into future career prospect in the fields related to Chemistry.
- ❖ To discuss and solve problems in the respective topics given in the syllabus enhances the concept's depth in students mind.
- ❖ To provide and explain the previous year's MCQs of various competitive examinations, students get boldness to confront without anxiety.

Outcomes:

After completion of this programme students will be able to

- ❖ Gain in-depth knowledge and idea for competitive examinations.
- ❖ Get the confidence and guidance to crack the various competitive examinations.

Unit I

(15 Hrs)

Atomic structure – basics of atomic structure, Schrodinger wave equation, quantum number, hydrogen atom wave functions, shapes of orbitals. Theoretical treatment of chemical bonding – types of bonding, VSEPR theory and shapes of molecules, hybridization, dipole moment, ionic solids.

Theory of gases – equation of state for ideal and non-ideal gases, kinetic theory of gases, Maxwell Boltzmann law, equipartition energy. Solid state – crystal and crystal systems, X-rays, NaCl and KCl structures-close packing, atomic and ionic radii, radius ratio rule, lattice energy, Born Haber cycle, isomorphism, heat capacity of solids.

Chemical thermodynamics- laws of thermodynamics.

Unit II

(15 Hrs)

Chemical and phase equilibria – laws of mass action, K_p , K_c , effect of temperature on K . Ionic equilibrium in solutions – pH and buffer solutions, hydrolysis, solubility products. Phase rule and its applications. Colligative properties.

Electrochemistry – Conductance and its applications, transport number, galvanic cells, EMF and free energy, concentration cells with and without transference, polarography, Debye-Huckel-Onsager theory of strong electrolytes. Chemical Kinetics- Reactions of various order, Arrhenius equation, collision theory, transition state theory, chain reactions, normal and branched, enzyme kinetics, photochemical processes, catalysis.

Unit III

(15 Hrs)

Basic concepts in organic chemistry – IUPAC nomenclature, reactive intermediates, principles of stereochemistry – conformational analysis, isomerism and chirality, concepts of aromaticity, named reactions, transformations and rearrangement, chemistry of aromatic and heterocyclic compounds.

Chemistry of natural products – alkaloids, steroids, terpenes, carbohydrates, amino acids, peptides and nucleic acids.

Physical characteristics of organic compounds by IR, UV, NMR and Mass.

Unit IV

(15 Hrs)

Chemical periodicity – structure and bonding homo and hetero nuclear molecules. Chemistry of the main group elements (s and p blocks) and their compounds – allotropy, synthesis, bonding and structure.

Chemistry of transition elements. Co-ordination compounds – bonding theories, spectral and magnetic properties. Organometallic compounds – synthesis, bonding, structure and reactivity.

Unit V

(15 Hrs)

Analytical chemistry – principles of qualitative and quantitative analysis – acid-base, oxidation-reduction and complexometric titrations using EDTA, precipitation reactions, use of indicators, use of organic reagents in organic analysis, radio activity, nuclear reactions- applications of isotopes.

Bio-inorganic chemistry – essential and trace elements of life- basic reactions in the biological systems and the role of metal ions- structure and function of hemoglobin, myoglobin and carbonic anhydrase.

Reference books:

- 1) IIT-JAM: M.Sc. (Chemistry) Previous Papers & Practice Test Papers (Solved), R. K Gupta, Arihand publications
- 2) Organic Chemistry-Clayden, Greeves, Warner and Wothers
- 3) Organic Chemistry (Vol-II) - I. L. Finar
- 4) Concise Inorganic Chemistry, J. D. Lee
- 5) Inorganic Chemistry, James E. Huheey
- 6) Physical Chemistry, Puri, Sharma, Pathania