

S-VYASA

Swami Vivekananda Yoga Anusandhana Samsthana
(Deemed to be University u/s 3 of UGC Act, 1956)

Total marks: 50

Duration: 45 min

Pass marks: 25

I. Syllabus of Chemistry

15 Marks

1. Foundations of Chemistry:

Atomic structure and chemical periodicity, fundamental principles of chemical bonding (VSEPR, Molecular Orbital Theory), basic concepts of thermodynamics and thermochemistry, principles of chemical kinetics and rate laws, stereochemistry and conformational analysis, and basic mathematical concepts for chemistry (units, error analysis, and data handling).

2. Core Areas of Chemistry:

Organic Chemistry: Stereochemistry and Reaction mechanisms (nucleophilic/electrophilic substitutions, eliminations), reactive intermediates (carbocations, carbanions, free radicals), named organic reactions, rearrangements, and synthetic methodology.

Inorganic Chemistry: Coordination chemistry (bonding, spectra, and magnetism), organometallic chemistry, main group elements, bioinorganic chemistry, and solid-state chemistry.

Physical Chemistry: Quantum mechanics, molecular spectroscopy (UV-Vis, IR, NMR, Raman), chemical and phase equilibria, electrochemistry, surface chemistry, and polymer chemistry.

Analytical & Emerging Areas: Chromatographic separation techniques, green chemistry principles, environmental chemistry, and advanced nanomaterials.

II. Research Aptitude

15 Marks

- Research: Meaning, characteristics and types
- Steps of research
- Methods of research
- Research Ethics
- Paper, article, workshop, seminar, conference and symposium
- Statistics Concepts

III. Reasoning

10 Marks

- Number series
- Letter series
- Codes
- Relationships
- Classification

IV. Information and Communicating Technology (ICT)**5 Marks**

- ICT: meaning, advantages, disadvantages and uses
- General abbreviations and terminology
- Basics of internet and e-mailing

V. English Grammar**5 Marks**

Marking Scheme

1. The Test paper will consist of 50 objective type, multiple-choice questions.
2. Each question carries 01 (one) mark.
3. For each correct response, the candidate will get 01 (one) mark.
4. To answer a question, the candidate needs to choose one option as the correct option.
5. No marks will be awarded if more than one option is selected for a question.
6. There is no negative marking for incorrect response.
7. No marks will be given for questions un-answered / un-attempted / marked for Review.
8. In the test paper, if a question is found to be incorrect, ambiguous, or has multiple correct answers, one (01) mark will be awarded only to those candidates who have attempted the question and selected one of the correct options. The reason could be due to human error or technical error.



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I. Syllabus of Mathematics

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Linear Algebra: Vector spaces and subspaces, linear transformations, eigenvalues and eigenvectors

Abstract Algebra: Group Theory (basic)

Real Analysis: Continuity, convergence, uniform convergence

Complex Analysis: Analytic functions, complex integration, singularities

Topology: Basis and sub basis, continuous functions, compactness and connectedness.

Measure and integration: Measure spaces, Lebesgue measure, measurable functions, Lebesgue integration, convergence theorems

Fluid dynamics/Mechanics: Properties of fluids, Basic equations, Euler's equations of motion, Bernoulli's equation, Navier–Stokes equations

Ordinary and Partial Differential Equations: Higher order linear differential equations, systems of differential equations, Partial differential equations

Numerical Analysis: Solution of algebraic and transcendental equations, Numerical differentiation and integration

Probability and Statistics: Random variables, probability distributions, Joint probability distributions, hypothesis testing

Graph Theory and discrete mathematics: Graphs and trees, connectivity, planar graphs, set theory and relations, counting principles and combinatorics

Fourier Series and Fourier Transform: Fourier Series, Fourier Sine and Cosine Series, Fourier Transform, Inverse Fourier Transform

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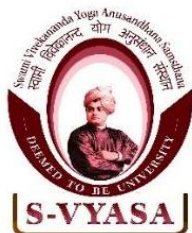
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I. Syllabus of Physics

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1. Foundations of Physics:

Covers the fundamental concepts, physical principles, and mathematical methods that form the basis for understanding and analyzing a wide range of phenomena in physics.

2. Core Areas of Physics:

- Quantum Mechanics and Classical Mechanics
- Mathematical Method for Physics and Numerical Methods
- Solid State Physics
- Electromagnetic theory
- Statistical Mechanics

II. Research Aptitude

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- Research: Meaning, characteristics and types
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