



राष्ट्रीय प्रौद्योगिकी संस्थान, कुरुक्षेत्र
NATIONAL INSTITUTE OF TECHNOLOGY
(Under the Ministry of Education, Govt. of India)
KURUKSHETRA-136119

RECRUITMENT OF OFFICER CADRE POSTS (REF.:ADVT. NO.:20/2025)

Name of the Post	:	Technical Officer - Chemistry (Level - 10)
Details of the Scheme & Pattern of Examination:	:	<ul style="list-style-type: none">Total Questions :160 (MCQ Type)Maximum Marks :160Negative Marking : 0.25 marks will be deducted for each wrong answer <p>Part-A (General Paper) (60)</p> <ul style="list-style-type: none">General English (15)Numerical Aptitude Arithmetic (15)Reasoning and Data Interpretation (15)General Knowledge and Current Affairs (15) <p>Part-B (Post Related Paper): (100)</p>
Duration of Examination	:	2.5 hours

SYLLABUS FOR SCREENING TEST

Part-A (General Paper)

- General English** - Tenses, Active and Passive, Direct & Indirect speech, Punctuation, Correction of sentence, One word substitutes, Modals, Articles, Clauses, Synonyms, Antonyms, Idioms & Phrases.
- Numerical Aptitude Arithmetic** - Simplification of Fractions, Simple and Compound Interest, Profit and Loss, Percentage, Averages, Number System, Time and Work, Problems on Trains, Calendar, Area, Problems on Numbers, Square root, Cube root, Time and Distance and Other Basic Arithmetic related problems.
- Reasoning and Data Interpretation** - Number Series Compilation, Missing Number finding, Pattern series, Direction Sense Test, Series Compilations, Classification, Missing Character finding, odd man out, Blood relations, Analogy, Coding & Decoding, Letter & Symbol Series, Verbal reasoning, Statements & Conclusions, Letter & Symbol Series, Logical Problems, Arithmetic Reasoning, Logical Sequence of Words, Pie Chart & Bar Chart
- General Knowledge and Current Affairs**- Indian History, Indian Economy, Indian Culture, Indian Polity, Indian Constitution, Indian Geography, Environmental Science, Awards and Honors, Famous Personalities, Days and Years, Basic General Knowledge, Current Affairs, Government Schemes, etc. upto 10th Standard.

Part-B (Post Related Paper)

1. **Some Basic Concepts of Chemistry:** Importance of Chemistry, Nature of Matter, Properties of Matter and their Measurement, Uncertainty in Measurement, Laws of Chemical Combinations, Dalton's Atomic Theory, Atomic and Molecular Masses, Mole Concept and Molar Masses, Percentage Composition, Stoichiometry and Stoichiometric Calculations.
2. **Structure of Atom:** Discovery of Sub-Atomic Particles, Atomic Models, Developments Leading to the Bohr's Model of Atom, Bohr's Model for Hydrogen Atom, Towards Quantum Mechanical Model of the Atom, Quantum Mechanical Model of Atom
3. **Classification of Elements and Periodicity in Properties:** Why do we Need to Classify Elements? Genesis of Periodic Classifications, Modern Periodic Law and the Present Form of the Periodic Table, Nomenclature of Elements with Atomic Numbers > 100, Electronic Configurations of Elements and the Periodic Table, Electronic Configurations and Types of Elements: s-, p-, d-, f- Blocks, Periodic Trends in Properties of Elements
4. **Chemical Bonding and Molecular Structure:** Kössel-Lewis Approach to Chemical Bonding, Ionic or Electrovalent Bond, Bond Parameters, The Valence Shell Electron Pair Repulsion (VSEPR) Theory, Valence Bond Theory, Hybridization, Molecular Orbital Theory, Bonding in Some Homonuclear Diatomic Molecules, Hydrogen Bonding.
5. **Thermodynamics:** Thermodynamic Terms , Applications, Measurement of ΔU and ΔH : Calorimetry, Enthalpy Change, $\Delta_r H$ of a Reaction – Reaction Enthalpy, Enthalpies for Different Types of Reactions, Spontaneity, Gibbs Energy Change and Equilibrium in Physical Processes, Equilibrium in Chemical Processes – Dynamic Equilibrium, Law of Chemical Equilibrium and Equilibrium Constant, Homogeneous Equilibria, Heterogeneous Equilibria, Applications of Equilibrium Constants , Relationship between Equilibrium Constant K, Reaction Quotient Q and Gibbs Energy G, Factors Affecting Equilibria, Ionic Equilibrium in Solution, Acids, Bases and Salts, Ionization of Acids and Bases, Buffer Solutions, Solubility Equilibria of Sparingly Soluble Salts
6. **Redox Reactions-** Classical Idea of Oxidation and Reduction Reactions, Redox Reactions in Terms of Electron Transfer Reactions, Oxidation Number, Redox Reactions and Electrode Processes
7. **Organic Chemistry – Some Basic Principles and Techniques:** General Introduction, Tetravalence of Carbon: Shapes of Organic Compounds, Structural Representations of Organic Compounds, Classification of Organic Compounds, Nomenclature of Organic Compounds, Isomerism, Fundamental Co Classification, Alkanes, Alkenes, Alkynes, Aromatic Hydrocarbon, Carcinogenicity and Toxicity.
8. **Solutions:** Types of Solutions, Expressing Concentration of Solutions, Solubility, Vapour Pressure of Liquid Solutions, Ideal and Non- ideal Solutions, Colligative Properties and Determination of Molar Mass, Abnormal Molar Masses
9. **Electrochemistry:** Electrochemical Cells, Galvanic Cells, Nernst Equation, Conductance of Electrolytic Solutions, Electrolytic Cells and Electrolysis, Batteries, Fuel Cells, Corrosion Chemical Kinetics Rate of a Chemical Reaction, Factors Influencing Rate of a Reaction, Integrated Rate Equations, Temperature Dependence of the Rate of a Reaction, Collision Theory of Chemical Reactions

10. **The d-and f-Block Elements:** Position in the Periodic Table, Electronic Configurations of the d- Block Elements, General Properties of the Transition Elements (d-Block), Some Important Compounds of Transition Elements, The Lanthanoids, The Actinoids, Some Ap
11. **Coordination Compounds:** Werner's Theory of Coordination Compounds, Definitions of Some Important Terms Pertaining to Coordination Compounds, Nomenclature of Coordination Compounds, Isomerism in Coordination Compounds, Bonding in Coordination Compounds, Bonding in Metal Carbonyls, Importance and Applications of Coordination, Compounds
12. **Haloalkanes and Haloarenes:** Classification, Nomenclature, Nature of C–X Bond, Methods of Preparation of Haloalkanes, Preparation of Haloarenes, Physical Properties, Chemical Reactions, Polyhalogen Compounds
13. **Alcohols, Phenols and Ethers:** Classification, Nomenclature, Structures of Functional Groups, Alcohols and Ph
14. **Aldehydes, Ketones and Carboxylic Acids:** Nomenclature and Structure of Carbonyl Group, Preparation of Aldehydes and Ketones, Physical Properties, Chemical Reactions, Uses of Aldehydes and Ketones, Nomenclature and Structure of Carboxyl Group, Methods of Preparation of Carboxylic Acids, Physical Properties, Chemical Reactions, Uses of Carboxylic Acids Amines Structure of Amines, Classification, Nomenclature, Preparation of Amines, Physical Properties, Chemical Reactions, Method of Preparation of Diazonium Salts, Physical Properties, Chemical Reactions, Importance of Diazonium Salts in Synthesis of Aromatic Compounds
15. **Biomolecules:** Carbohydrates, Proteins, Enzymes, Vitamins, Nucleic Acids, Hormones

Note:- The Syllabus is suggestive and indicative in nature having only broader areas for reference. The Candidate is expected to have the holistic and expanded knowledge of the subject/syllabus.
