



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

RECRUITMENT OF NON-TEACHING POSTS (REF.:ADVT. NO.:03/2023)

Name of the Post	:	Technician (Level - 3) (Chemistry)
Details of the Scheme & Pattern of Examination:	:	<u>PART A :</u> <ul style="list-style-type: none">• Total Questions :100 (MCQ Type)• Maximum Marks :100• No Negative Marking <u>Breakup</u> <ul style="list-style-type: none">○ General Awareness (20)○ Reasoning (20)○ Mathematics (20)○ Test of English/Hindi Language (30)○ Computer Awareness (10) <u>PART B :</u> <ul style="list-style-type: none">• Specialization (Chemistry): 30 Questions
Duration of Examination	:	2.5 hours

- The Question Paper shall be Bilingual (English & Hindi) except the Section for the Test of Language wherever applicable.
- The medium of Part-B will be English only.

SYLLABUS OF EXAMINATION

PART A:

General Awareness: Includes questions relating to History, Indian Polity & Constitution, Art & Culture, Geography, Economics, General Policy, Science & Scientific Research, National/International Organizations /Institutions, current events, environment etc.

Reasoning: Includes questions relating to both verbal and non-verbal types, analogies, similarities, differences, space visualization, problem solving, analysis, judgment, decision making, visual memory, discrimination, observation, relationship, concepts, arithmetical reasoning, verbal and figure classification, arithmetical number series etc.

Mathematics: Includes questions relating to Simplification, Decimals, Fractions, L.C.M., H.C.F., Ratio & Proportion, Percentage, Average, Profit & Loss, Discount, Simple & Compound Interest, Mensuration, Time & Work, Time & Distance, Tables & Graphs, etc.

Test of English or Hindi: In addition to the testing of candidate's understanding of

the English or Hindi Languages, it's Vocabulary, Grammar, Sentence Structure, Synonyms, Antonyms and its correct usage etc. would also be tested.

Computer Applications: Includes questions on Operating System, MS Office, MS Word, MS Excel, Power Point, Tally, Internet, E-mail, Antivirus and various online tools used in day- to-day office work.

PART B:

o **Chemistry**

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

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

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

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, Hybridisation, Molecular Orbital Theory, Bonding in Some Homonuclear Diatomic Molecules, Hydrogen Bonding

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 Equilibrium 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

Redox Reactions: Classical Idea of Redox Reactions-Oxidation and Reduction Reactions, Redox Reactions in Terms of Electron Transfer Reactions, Oxidation Number, Redox Reactions and Electrode Processes

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

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

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

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

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

Haloalkanes and Haloarenes: Classification, Nomenclature, Nature of C–X Bond, Methods of Preparation of Haloalkanes, Preparation of Haloarenes, Physical Properties, Chemical Reactions, Polyhalogen Compounds

Alcohols, Phenols and Ethers: Classification, Nomenclature, Structures of Functional Groups, Alcohols and Ph

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

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.
