

Post S. No	Notification Number	Name of the Post
12	CUTN/NT/03/2016	Sr. Technical Assistant (Lab)

PHYSICS

General and Comprehensive Testing: 50 Marks

- a. General knowledge, English, Numerical Skills, Computer Knowledge and logical thinking

Subject Knowledge: 50 Marks

- a. At the level of BSc / MSc in topics related to Properties of Matter, Classical mechanics, Quantum mechanics, Heat and Thermodynamics – Statistical Physics, Mathematical Physics, Electromagnetic Theory, Nuclear Physics, Atomic and Molecular Physics – Spectroscopy, Optics and Sound, Condensed matter physics and electronics-with emphasis on experimental parts.

Skill Test: 50 Marks

Technical Skill Evaluation – Practical in the laboratory

CHEMISTRY

Inorganic Chemistry

1. Chemical periodicity
2. Structure and bonding in homo- and heteronuclear molecules, including shapes of molecules (VSEPR Theory).
3. Concepts of acids and bases, Hard-Soft acid base concept, Non-aqueous solvents.
4. Main group elements and their compounds: Allotropy, synthesis, structure and bonding, industrial importance of the compounds.
5. Transition elements and coordination compounds
6. Inner transition elements: spectral and magnetic properties, redox chemistry, analytical applications.
7. Organometallic compounds: synthesis, bonding and structure, and reactivity.
8. Analytical chemistry- separation, spectroscopic, electro- and thermo analytical methods.
9. Characterisation of inorganic compounds by IR, Raman, NMR, UV-vis, MS, electron spectroscopy and microscopic techniques.
10. Nuclear chemistry: nuclear reactions, fission and fusion, radio-analytical techniques and activation analysis.

Physical Chemistry:

1. Basic principles of quantum mechanics: Postulates; operator algebra; exactly- solvable systems: particle-in-a-box, harmonic oscillator and the hydrogen atom, including shapes of atomic orbitals; orbital and spin angular momenta.
2. Atomic structure and spectroscopy; term symbols; many-electron systems and antisymmetry principle.
3. Chemical bonding in diatomics; elementary concepts of MO and VB theories; Huckel theory for conjugated π -electron systems.
4. Chemical applications of group theory; symmetry elements; point groups; character tables; selection rules.
5. Chemical thermodynamics: Laws, state and path functions and their applications; thermodynamic description of various types of processes; Maxwell's relations; spontaneity and equilibria; temperature and pressure dependence of thermodynamic quantities; Le Chatelier principle; elementary description of phase transitions; phase equilibria and phase rule; thermodynamics of ideal and non-ideal gases, and solutions.
6. Electrochemistry: Nernst equation, redox systems, electrochemical cells; DebyeHuckel theory; electrolytic conductance – Kohlrausch's law and its applications; ionic equilibria; conductometric and potentiometric titrations.
7. Chemical kinetics: Empirical rate laws and temperature dependence; complex reactions; steady state approximation; determination of reaction mechanisms; collision and transition state theories of rate constants; unimolecular reactions; enzyme kinetics; salt effects; homogeneous catalysis; photochemical reactions.
8. Solid state: Crystal structures; Bragg's law and applications; band structure of solids.
9. Data analysis: Mean and standard deviation; absolute and relative errors; linear regression; covariance and correlation coefficient.

Organic Chemistry

1. IUPAC nomenclature of organic molecules including regio-and stereoisomers.
2. Principles of stereochemistry: Configurational and conformational isomerism in acyclic and cyclic compounds; stereogenicity, stereoselectivity, enantioselectivity, diastereoselectivity and asymmetric induction.
3. Aromaticity: Benzenoid and non-benzenoid compounds – generation and reactions.
4. Organic reactive intermediates: Generation, stability and reactivity of carbocations, carbanions, free radicals, carbenes, benzyne and nitrenes.
5. Organic reaction mechanisms involving addition, elimination and substitution reactions with electrophilic, nucleophilic or radical species. Determination of reaction pathways.
6. Common named reactions and rearrangements – applications in organic synthesis.
7. Organic transformations and reagents: Functional group interconversion including oxidations and reductions; common catalysts and reagents (organic, inorganic, organometallic and enzymatic). Chemo, regio and stereoselective transformations.
8. Pericyclic reactions – electrocycloisatation, cycloaddition, sigmatropic rearrangements and other related concerted reactions. Principles and applications of photochemical reactions in organic chemistry.
9. Reactivity of common heterocyclic compounds containing one or two heteroatoms (O, N, S).
10. Qualitative and quantitative analysis, separation of mixtures and lab techniques.
11. Structure determination of organic compounds by IR, UV-Vis, ^1H & ^{13}C NMR and Mass spectroscopic techniques.

General Chemistry

1. Solutions
2. Green chemistry
3. Environmental chemistry
4. Good laboratory Practices
5. Safety and First aid techniques

Skill Test: 50 Marks

Technical Skill Evaluation – Practical in the laboratory

***Syllabus for Life Science will be flashed separately.**

Post S. No	Notification Number	Name of the Post
04	CUTN/NT/02/2016	Hindi (Jr) Translator

1. Translate into English Words
2. Translate into Hindi Words
3. Translate into English Expressions
4. Translate into Hindi Expressions
5. Translate into English Sentences
6. Translate into Hindi Sentences
7. Write the Correct Answer (Questions from Hindi language, literature and Official language)
8. Correct the Sentences
9. Write Two Model Letters
10. Translate into English (One Paragraph)
11. Translate into Hindi (One Paragraph)
