UP TGT SCIENCE SYLLABUS 2026

Subject Code - 05

Section A: Physics

1. General Physics (Mechanics)

Units and Dimensions, Vector and Scalar quantities, Product (Scalar and Vector products), Gradient, Divergence and Curl, Gauss, Stokes Theorem and applications. Motion, Force and Acceleration, Equations of Motion, Kinetic and Potential Energy, Linear and Angular momentum. Conservation of Energy and Momentum, Conservative and Non-conservative forces, Rotational motion, Centrifugal and Centripetal force, Gravitational force, Central force, Kepler's laws of planetary motion, Geostationary satellites, Gravitational acceleration, Escape velocity, Simple and Compound pendulum, Moment of Inertia, Parallel and Perpendicular axes theorem, Moment of Inertia of sphere, ring, disc and cylinder, Angular momentum and torque. Streamlined and turbulent flow, Critical velocity, Stokes and Poiseuille's formulas, Bernoulli's theorem and applications. Surface tension, Excess pressure inside curved surfaces of liquids, Surface energy, Flow of liquid in a capillary. Elasticity: Elastic constants, mutual relations between them, Bending moment, Cantilever. Theory of Relativity, change in length, time and mass, Mass-Energy equivalence.

2. Heat

Concept of heat and temperature, Various temperature measuring scales, Absolute temperature, Thermal expansion of solids, gases and liquids, Conductors and Insulators, Radiation of heat, Black body radiation, Rayleigh-Jeans and Wien's laws, Planck's radiation formula, Newton's law of cooling, Stefan's law, Internal energy, Isothermal and Adiabatic changes, First and Second laws of thermodynamics, Carnot engine, Entropy, Maxwell's thermodynamic relations, Joule-Thomson effect, Clausius-Clapeyron equation.

3. Waves and Oscillations

Simple harmonic motion, Progressive and Stationary waves, Phase and Group velocity, Damped harmonic motion, Forced oscillations and resonance, Resonance sharpness. Superposition of waves, Beats and Lissajous figures, Doppler effect.

4. Optics

Spherical mirrors and lenses, Refractive index, Formulas for focal lengths, Coaxial system, Combination of thin lenses, Eyepieces, Ramsden and Huygens eyepieces, Chromatic aberration of lenses, Human eye, Long-sightedness, Short-sightedness. Basic concepts of Interference, Diffraction and Polarization, Biprism, Newton's rings, Fresnel-Fraunhofer diffraction, Rayleigh criterion, Resolving power, Zone plate and working principles of gratings. Double refraction, Plane, circular and elliptical polarization, Quarter and Half-wave plates, General concept of Laser, Ruby and Helium-Neon lasers.

5. Electricity and Magnetism

Primary and Secondary cells, Internal resistance, Electromotive force, Laws of combination of resistances and capacitors, Current, Drift velocity and Conductivity, Galvanometer, Ammeter and Voltmeter, Wheatstone bridge and its applications, Electric Field, Electric Potential, Gauss Law, Biot-Savart law, Ampere's circuital law, Electromagnetic induction, Faraday's and Lenz's laws. Self-induction and Mutual induction, Alternating current, Series and Parallel (LCR) circuits, Introductory knowledge of dia-, para- and ferro-magnetism, Electromagnetic Maxwell's equations, Displacement current, Electromagnetic waves.

6. Modern Physics

Structure of atom, Vector and Bohr's model of atom, Pauli's Exclusion Principle, Optical and X-ray Spectra, Photoelectric effect, Compton effect, Zeeman, Paschen-Back and Raman effect, de Broglie Waves, Uncertainty principle, Schrödinger equation, Radioactivity, Metals, Semiconductors and Insulators, P-N Junction, Zener Diode, Transistor and their uses. Logic gates, Truth tables, Boolean algebra.

Section B: Chemistry

1. Matter & Laws of Chemical Combinations

Matter: Nature and behaviour, types of matter, elements and their classification (metals and non-metals), compounds and their mixtures. Laws of Chemical Combinations: Laws of constant proportions, multiple proportions and reciprocal proportions, Gay-Lussac's law of gaseous volumes, Mitscherlich's law of isomorphism.

2. Structure of Matter & Atomic Structure

Structure of Matter: Dalton's atomic theory, atoms, molecules and their characteristics. Atomic structure: Discovery of the electron, proton, and neutron. Rutherford's alpha-ray scattering experiment and discovery of the nucleus. Atomic models of Rutherford, Bohr and Sommerfeld. Quantum numbers, modern atomic theory. de Broglie equation, Heisenberg Uncertainty

principle, shape of s, p and d orbitals, Electronic configuration based on Aufbau principle, Hund's rule and Pauli's exclusion principle.

3. Radioactivity

Discovery of radioactivity, radioactive rays and their characteristics, half life and average life, laws of radioactive decay, nuclear fission and fusion, artificial radioactivity. Isotopes, Isobars and Isoelectronics.

4. Chemical Bonding

Fundamental concepts of valency, electronic theory, octet rule, exceptions to octet rule, electrovalent, covalent and coordinate bonds. Characteristics of ionic, covalent and coordinate compounds. Polarization and Fajans' rule. Inert pair effect, valence bond theory of covalency (for hydrogen molecule), hybridization and shapes of sp, sp^2, sp^3 hybrid orbitals.

5. Chemical Reactions & Types

Symbols, ions, and formulas, presentation of chemical reactions by chemical equations. Physical and chemical changes and their differences. Types of chemical reactions: Displacement, addition, dissociation, decomposition, double decomposition, slow, fast, exothermic, endothermic and catalysed reactions.

6. Electrochemical Cells

Voltaic cell and its mechanism of working, Dry cell, lead storage battery, reversible cell, electrode potential, Nernst equation and its applications.

7. Periodic Classification of Elements

Mendeleeff's periodic classification and its basis, Merits and demerits of the Mendleeff's periodic table, modified form of the periodic table and its important features, periodic properties of elements (atomic and ionic radii, ionization potential, electron affinity and electronegativity), variation of periodic properties in groups and periods. General properties of s and p block elements. Discussion of the properties of first row transition elements (3d block elements) with reference to their electronic configuration, oxidation state, colour, magnetic properties and complex compounds formation.

8. General Organic Chemistry

Inductive, electromeric and mesomeric effects, Hyperconjugation, resonance and their applications, electrophilic and nucleophilic reagents, free radicals, carbocations and carbanions. Hydrogen bonding and its effects. Classification and nomenclature of organic compounds.

9. Isomerism & Organic Compounds

Isomerism: Structural and stereoisomerism, concept of mechanism of organic reactions, mechanism of simple substitution, addition and neutralization reactions. Methods of preparation of the following Organic compounds and their properties: alkanes, alkenes, alkynes, alkyl halides, ketones, acids and their derivatives. Benzene, its preparation, properties and structure.