APPENDIX-9
SYLLABUS FOR WBJEE-2026

Chapter No.	MATHEMATICS
1)	**Algebra:** A.P., G.P., H.P.: Definitions of A.P., G.P., and H.P.; General term; Summation of first n-terms of series Σn, Σn^2, Σn^3; Arithmetic/Geometric series, A.M., G.M. and their relation; Infinite G.P. series and its sum.
2)	**Logarithms:** Definition; General properties; Change of base.
3)	**Complex Numbers:** Definition in terms of ordered pair of real numbers and its representation in a plane; Argand plane and properties of complex numbers; Complex conjugate; Triangle inequality; Amplitude of complex numbers and its properties; Square root of complex numbers; Cube roots of unity and its applications; De Moivre's theorem (statement only) and its elementary applications; Solution of quadratic equation in the complex number system.
4)	**Polynomial Equation:** Polynomial equation with real coefficients, Fundamental theorem of Algebra; Quadratic equations with real coefficients; Relations between roots and coefficients; Nature of roots; Formation of a quadratic equation; Sign and magnitude of the quadratic expression $ax^2 + bx + c$ (where a, b, c are rational numbers and $a \neq 0$).
5)	**Permutation and Combination:** Permutation of n different things taken r at a time ($r \leq n$); The permutation of things which are not all different; Permutation with repetitions; Combinations of n different things taken r at a time ($r \leq n$); Combination of things not all different; Problems involving both permutations and combinations.
6)	**Principle of Mathematical Induction:** Statement of the principle, proof by induction for the sum of squares; The sum of cubes of first n natural numbers; Divisibility properties like $2^{2n} - 1$ is divisible by 3 ($n \geq 1$), 7 divides $3^{2n+1} + 2^{n+2}$ ($n \geq 1$), etc.
7)	**Binomial Theorem** (positive integral index)**:** Statement of the theorem; General term; Middle term; Equidistant terms and Properties of binomial coefficients and its applications.
8)	**Matrices:** Concepts of $m \times n$ ($m \leq 3, n \leq 3$) real matrices; Operations of addition, Scalar multiplication and Multiplication of matrices; Transpose of a matrix; Determinant of a square matrix; Properties of determinants; Minor, Cofactor and Adjoint of a matrix; Non-singular

	matrix; The inverse of a matrix; Solutions of system of linear equations (Not more than 3 variables); Application of Determinants in finding the area of triangle.
9)	**Sets, Relations and Mappings:** Concept of sets; Subsets, Power set, Complement, Union, Intersection, Difference and Symmetric difference of sets; Venn diagram; De Morgan's Laws; Inclusion / Exclusion formula for at most three sets; Cartesian product of sets.
10)	**Relation and its Properties:** Equivalence relation — definition and elementary examples; Mapping; Range and Domain; Injective, Surjective, and Bijective mappings; Composition of mappings; Inverse of a mapping.
11)	**Statistics and Probability:** Measure of dispersion; Mean; Variance and Standard deviation; Frequency distribution; Notion of probability; Addition and Multiplication rules of probability; Conditional probability and Bayes' Theorem; Independence of events; Repeated independent trials and Binomial distribution.
12)	**Trigonometry:** Trigonometric functions; Compound angles; Addition and Subtraction formulae; Formulae involving Multiple and Submultiple angles; General solution of trigonometric equations; Inverse trigonometric functions and their properties.
13)	**Coordinate Geometry of Two Dimensions:** **Coordinates:** Distance formula; Section formula; Area of a triangle; Condition of collinearity of three points in a plane; Polar coordinates; Transformation from Cartesian to polar coordinates and vice versa; Parallel transformation of axes; Concept of locus; Problems on Locus involving familiar geometrical configurations.
14)	**Straight Lines:** The slope of a straight line; Equation of straight lines in different forms; The angle between two straight lines; Condition of perpendicularity and parallelism of two straight lines; Distance of a point from a straight line; Distance between two parallel straight lines; Straight lines through the point of intersection of two straight lines; Equations of bisectors of angles between two straight lines.
15)	**Circle & Conic Sections:** Equation of a circle with a given centre and radius; Condition that a general equation of second degree in x, y may represent a circle; Equation of a circle in terms of endpoints of a diameter; Parametric equation of a circle; Equation of tangent, normal and chord of a Circle; The intersection of a straight line with a circle; Equation of common chord and common tangent of two intersecting circles; Definition of conic section; Directrix; Focus and Eccentricity; Classification based on eccentricity; Equation of Parabola, Ellipse and

	Hyperbola in standard form; Their foci, directrices, eccentricities and parametric equations.
16)	**Co-ordinate Geometry of Three Dimensions:** Direction cosines and Direction ratios; Distance between two points and Section formula; Equation of a straight line; Equation of a plane and Distance of a point from a plane and straight lines; Angle between two straight lines; Shortest distance between two skew lines.
17)	**Calculus:** **Differential Calculus:** Functions; Domain and Range of functions; Composition of two functions and Inverse of a function; Basic properties of functions; Limit; Continuity; Differentiability; Derivative; Chain rule and Derivative of functions in various forms; Concept of differential and its applications; Second order derivative.
18)	**Rolle's Theorem and Lagrange's Mean Value Theorem** (statement only). Their geometric interpretation and Elementary application; L'Hospital's rule (statement only) and applications.
19)	**Integral Calculus:** Integration as a reverse process of differentiation; Indefinite integral of standard functions; Integration by parts; Integration by substitution and Partial fraction; Definite integral as a limit of a sum with equal subdivisions; Fundamental theorem of integral calculus and its applications; Properties of definite integrals.
20)	**Differential Equations:** Formation of ordinary differential equations; Order and Degree of differential equations; Solution of homogeneous differential equations; Separation of variables method; Linear first order differential equations.
21)	**Application of Calculus:** Differential coefficient as a measure of rate; Determination of monotonicity of functions; Maxima and Minima of functions; Tangent and Normal; Conditions of tangency; Motion in a straight line with constant acceleration; Calculation of area bounded by elementary curves and Straight lines; The area of the region included between two elementary curves.
22)	**Vectors:** Addition of vectors; Scalar multiplication; Dot and Cross products; Scalar triple product; Geometrical interpretation of these products and their applications.

Chapter No.	PHYSICS
1)	**Physical World, Measurements, Units & dimensions**: Physical World, fundamental and derived units. Units & Dimensions of physical quantities, dimensional analysis & its applications. Need for measurement, units of measurement, accuracy and precision of measurements, error in measurement, rounding off and order of magnitude, significant figures and their application.
2)	**Motion in one dimension and two dimensions:** Inertial frame and non-inertial frame of reference, motion in a straight line, elementary differential and integral calculus for describing motion, position- time, velocity- time and relevant graphs. Uniformly accelerated motion and its associated graphical representations. Instantaneous velocity and relation for uniformly accelerated motion (graphical and calculus treatment).
3)	**Motion in a Plane** Scalars and vectors, representation of vectors in 3D, dot and cross product and their application, resolution of vectors, rectangular and non-rectangular. Relative velocity, Motion in a plane, cases of uniform velocity and uniform acceleration, uniformly accelerated motion (using graphical and calculus methods), projectile motion and inclined plane.
4)	**Laws of Motion** Force and inertia, Newton's laws of motion, impulse and impulsive force, Conservation of linear momentum with applications, Concept of free body diagram and its application, Equilibrium of concurrent force, Static and Kinetic friction, laws of friction, ideas of coefficient of friction, rolling friction. Dynamics of uniform circular motion, centripetal and centrifugal forces and their applications, banking of roads,
5)	**Work, power, energy:** Work, power, energy, work-energy theorem with constant and variable forces, work done by constant & variable forces, potential energy (PE) & kinetic energy (KE), conservation of mechanical energy, conservative and nonconservative forces, PE of a spring, motion in a vertical circle, elastic and inelastic collisions in one and two dimensions.
6)	**Motion of system of particles and rigid body:** Centre of mass of the two- particle system, motion of the connected system, torque, angular momentum, law of conservation of angular momentum and its

	application, equilibrium of rigid bodies, concept of moments of inertia with idea of radius of gyration, moments of inertia of simple geometric bodies [without derivation], parallel and perpendicular axis theorem and their applications.
7)	**Gravitation:** Universal law of gravitation, acceleration due to gravity (g), variation of g, Kepler's laws and applications, gravitational potential & PE, escape velocity, orbital velocity of satellites, time period of satellites, geostationary satellites.
8)	**Bulk properties of matter:** Elasticity, Hooke's law, Young's modulus, bulk modulus, idea of compressibility, shearing modulus, Poisson's ratio, elastic potential energy of stretched string and extended spring, Fluid pressure: Pressure due to a fluid column, buoyancy, Pascal's law, effect of gravity on fluid pressure. Surface tension: Surface energy, phenomena involving surface tension, excess pressure, application of surface tension for drops and bubbles, angle of contact, and capillary rise.
9)	**Viscosity:** Coefficient of viscosity, streamline & turbulent motion, Reynolds' number, Stokes' law, terminal velocity, Bernoulli's theorem and its applications.
10)	**Heat & Thermal Physics:** Heat & temperature, thermal expansion of solids. Liquids & gases, ideal gas laws, isothermal & adiabatic processes; anomalous expansion of water & its effects, sp. heat capacity, Calorimetry: change of state, specific latent heat capacity. Heat transfer: conduction, convection and radiation, conduction of heat through slabs in series and parallel combination and the idea of equivalent thermal conductance. Black body radiation, Kirchhoff's law, thermal conductivity, Newton's law of cooling, Wien's displacement law, Stefan's law and Boltzmann's correction.
11)	**Thermodynamics:** Thermal equilibrium (Zeroth law of thermodynamics), concept of heat, external work and internal energy. 1st law of thermodynamics, C_P and C_V determination and relation between them, isothermal & adiabatic processes and relation equations, P-V diagrams, calculation of external works. 2nd law of thermodynamics, reversible & irreversible processes, Carnot engine and its efficiency, efficiency of refrigerator (only qualitative idea).
12)	**Kinetic theory of gases:** Equation of state of a perfect gas, kinetic theory of gases, assumptions in Kinetic theory of gases, concept of

	pressure. & temperature; rms speed of gas molecules; degrees of freedom, law of equipartition of energy (introductory ideas) & application to specific heats of gases; mean free path, Avogadro's number.
13)	**Oscillations & Waves:** Periodic motion – time period, frequency, time-displacement equation, Simple harmonic motion (S.H.M) & its equation; phase; SHM in different systems, restoring force & force constant, energy in S.H.M.-KE & PE, determination of time period of simple pendulum, loaded spring, liquid-filled U-tubes, floating body in liquid, vertical SHM. Free, forced & damped oscillations (introductory ideas), resonance wave motion, equation for progressive wave, longitudinal & transverse waves, sound waves. Newton's formula & Laplace's correction, factors affecting the velocity of sound in air, principles of superposition of waves, reflection of waves, standing waves in strings & organ pipes, fundamental mode, harmonics &overtones, beats, Doppler effect of sound.
14)	**Electrostatics:** Conservation of electric charges, Coulomb's law force between two-point charges, forces between multiple charges; superposition principle & continuous charge distribution. Electric field: electric field due to a point charge, electric field lines. Electric dipole, electric field due to a dipole (at a point on its axis, at a point on its perpendicular bisector, at any point), and torque on a dipole in a uniform electric field. Electric flux, statement of Gauss's theorem and its application to find the field due to an infinitely long straight wire, a uniformly charged infinite plane sheet, and a uniformly charged thin spherical shell (field inside and outside). Electric potential, potential difference, relation between electric field intensity and potential, electric potential: due to a point charge, a dipole and a system of point charges, equipotential surface and its properties, electrical potential - energy of a system of two-point charges and of an electric dipole in an electrostatic field. Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarization. Capacitors and capacitance are a combination of capacitors in series and in parallel. Capacitance of parallel plate capacitors with or without a dielectric medium between the plates. Capacitances of solid and hollow spherical capacitors. Energy is stored in a capacitor. Examples of capacitors in our daily life (only qualitative ideas).

15)	**Current Electricity:** Electric current, the flow of electric charge in a metallic conductor. Drift velocity, mobility and their relation with electric current. Ohm's law, electrical resistance, resistivity and conductivity. V-I characteristics for ohmic resistance, temperature dependence of resistance. Series, parallel and mixed grouping of resistances. Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel and in mixed grouping. Parallel combination of two cells of unequal emfs, series combination of n cells of unequal emfs. Kirchhoff's law and simple applications. Wheatstone bridge principle, Meter Bridge principle (end error correction not required). Potentiometer: principle and its applications to measure the potential difference and for comparing emfs of two cells, and measurement of the internal resistance of a cell.
16)	**Magnetic effect of current and Magnetism:** Concept of magnetic field, Oersted's experiment, Biot - Savart law & its application to current carrying circular loop; Ampere's law & its applications to infinitely long straight wire, straight and toroidal solenoids; force on a moving charge in uniform magnetic & electric fields, cyclotron frequency; force on a current-carrying conductor in a uniform magnetic field, force between two parallel current-carrying conductors-- definition of ampere. Torque experienced by a current loop in a uniform magnetic field; moving coil galvanometer current sensitivity & conversion to ammeter & voltmeter, Inter-conversion of voltmeter & ammeter & change of their ranges. Current loop as a magnetic dipole & its magnetic dipole moment, magnetic dipole moment of a revolving electron, magnetic field intensity due to a magnetic dipole bar magnet along its axis & perpendicular to its axis, torque on a magnetic dipole (bar magnet) in a uniform magnetic field; magnet as an equivalent solenoid, magnetic field lines; Earth's magnetic field & its magnetic elements. Magnetic properties of a material: magnetic permeability, magnetic susceptibility, intensity of magnetisation, magnetic retentivity and coercivity. Hysteresis: B – H loop and its significance (only qualitative idea). Para-, dia- & ferromagnetic substances, with examples. Electromagnets & the factors affecting their strengths, permanent magnets.
17)	**Electromagnetic induction & alternating current:** Electromagnetic induction, concept of magnetic flux.

	Faraday's laws, induced emf and current, Lenz's law, and Eddy current. Concept of self and mutual inductance, self-inductance of a solenoid and mutual inductance of two coaxial solenoids (qualitative ideas). Alternating current, peak and RMS values of alternating current/voltage, reactance and impedance. Concept of phasor diagram: only resistive circuit, only inductive circuit, only capacitive circuit. LR circuit, CR circuit, and LCR series circuit, resonance LC oscillator (qualitative idea only). Power in an AC circuit, power factor in an AC circuit, wattless current. AC generator and transformer.
18)	**Electromagnetic waves:** Basic idea of displacement current. Electromagnetic waves and their characteristics (qualitative ideas only). Transverse nature of electromagnetic waves, electromagnetic spectrum, applications of the waves from the different parts of the spectrum, Basic idea of displacement current.
19)	**Optics I (Ray optics):** Reflection of light, spherical mirrors, mirror formula. Refraction of light, total internal reflection & its applications, optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula. Newton's relation: Displacement method to find the position of images (conjugate points), Magnification, power of a lens, A combination of thin lenses in contact, a combination of a lens & a mirror. Refraction and dispersion of light through a prism; optical instruments, image formation & accommodation, correction of eye defects (myopia, hypermetropia) using lenses, microscopes & astronomical telescopes (reflecting & refracting) & their magnifying powers.
20)	**Optics II (Wave Optics):** Wave front and Huygens' principle, reflection and refraction of a plane wave at a plane surface using Huygens' principle. Interference: interference of monochromatic light by double slits – Young's experiment, conditions for sustained interference of light – coherent sources, conditions of maxima and minima in terms of path difference and phase difference, expression for the fringe width. Diffraction: Fraunhoffer's diffraction due to a single slit, width of the central maximum.

	Resolving power of microscope and astronomical telescope. Polarisation, plane polarised light. Brewster's law uses plane-polarised light and a polaroid. The scattering of the light-blue colour of the sky is an elementary example of the Raman effect. Particle nature of light & wave-particle dualism: Particle nature of light, Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation Matter waves; wave nature of particles, De Broglie relation and its simple applications.
21)	**Atomic Physics:** Alpha-particle scattering experiment, Rutherford's nuclear atom model of atom; Bohr model of hydrogen atom, energy levels in a hydrogen atom, hydrogen spectrum, continuous & characteristic X-rays, Moseley's law.
22)	**Nuclear Physics:** Composition & size of nucleus, atomic masses, isotopes, isobars; isotones, radioactivity - alpha, beta & gamma particles/ rays & their properties; radioactive decay law; mass-energy relation, mass defect; binding energy per nucleon & its variation with mass number; chain reaction, nuclear fission & fusion.
23)	**Solid state Electronics:** Band theory of solids (qualitative ideas only), classification of conductors, insulators & semiconductors in terms of band theory; Intrinsic and extrinsic semiconductors, Band Diagram.
24)	**Semiconductor diode:** P-N junction diode, I-V characteristics in forward & reverse bias, diode as a rectifier; basic construction and I-V characteristics of LED, photodiode, solar cell. Zener diode: I-V characteristics, Zener diode as a voltage regulator. Bipolar junction transistor (BJT), transistor action, characteristics of a BJT, BJT as an amplifier (CE configuration) & oscillator. Logic gates (OR, AND, NOT, NAND & NOR) and their simple combinations.

Chapter No.	CHEMISTRY
1)	**Some Basic Concepts of Chemistry** Laws of chemical combination. Concept of elements, atoms and molecules. Atomic and molecular masses. Mole concept and molar mass, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry. Different concentration terms of solutions and related calculations.
2)	**Structure of an Atom** Bohr's model and its limitations, concept of shell and sub-shells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertainty principle, Schrödinger wave equation (elementary idea only). Concept of orbitals, quantum numbers, shapes of *s, p* and *d* orbitals, rules for filling electrons in orbitals: Aufbau principle, Pauli's exclusion principle and Hund's rule, exchange energy, electronic configuration of an atom, stability of half-filled, completely filled orbitals.
3)	**Classification of Elements and Periodicity in Properties** Modern periodic law and the present form of the periodic table; periodic trends in the properties of elements – atomic radii, ionic radii, van der Waals' radii, ionization enthalpy, electron gain enthalpy, electronegativity, valency. Nomenclature of elements with atomic number greater than 100.
4)	**Chemical Bonding and Molecular Structure** Valence electrons, ionic bond, bond parameters, covalent bond, Lewis structure, formal charge, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization involving *s, p* and *d* orbitals and shapes of some simple molecules, intermolecular interactions (dipolar interactions, London dispersion forces, van der Waals' interactions), intra- and intermolecular hydrogen bonding, Molecular orbital theory of homonuclear diatomic molecules (H_2, He_2, O_2, N_2, F_2 – qualitative idea only)
5)	**States of Matter - Solids and Gases** Classification of solids (elementary idea): molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea), unit cell in two-dimensional and three-dimensional lattices, packing efficiency, calculation of density of unit cell, packing in solids, voids, number of atoms per unit cell in a cubic unit cell, point defects.

	Kinetic theory of gas, molecular speeds, Dalton's law of partial pressure, Graham's law, deviation from ideal behaviour and van der Waals' equation of state, Liquefaction of gases, critical parameters.
6)	**Chemical Thermodynamics** Concepts of system (including types of system), surroundings. Work, heat, energy, extensive and intensive properties, state function, Zeroth law of thermodynamics and definition of temperature. The first law of thermodynamics – internal energy change (ΔU) and enthalpy change (ΔH), Enthalpy of bond dissociation, combustion, formation, atomization, ionization, solution and sublimation. Transformation of state. Hess's law of constant heat summation, Born Haber Cycle and its application. 2nd law of thermodynamics, the introduction of entropy as a state function, Gibbs free energy change for spontaneous and non-spontaneous processes, criteria for equilibrium.
7)	**Equilibrium** Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium – Le Chatelier's principle; ionic equilibrium, ionisation of acids and bases, strong and weak electrolytes, degree of ionisation of polybasic acids, acid strength, concept of pH, Henderson Equation. Hydrolysis of salts (elementary idea). Buffer solutions, buffer action, solubility product, common ion effect (with illustrative examples).
8)	**Solutions** Introduction, solubility of gases in liquids, solid solutions, vapour pressure and Raoult's law. Colligative properties: relative lowering of vapour pressure, elevation of boiling point, depression of freezing point, and osmotic pressure. Determination of molecular mass using colligative properties. Abnormal molecular mass, van't Hoff factor and calculations involving it. Colloidal solution, true solutions, colloids and suspensions.
9)	**Chemical Kinetics** Rate of a reaction (average and instantaneous), factors affecting the rate of reaction: concentration, temperature and catalyst. Order and molecularity of a reaction. rate law and specific rate constant, integrated rate equations and half-life (only for zero and first order reactions), Arrhenius equation, activation energy, the concept of collision theory (elementary idea, no mathematical treatment). Catalysis, homogeneous and heterogeneous catalysis, enzyme catalysis.
10)	**Redox Reactions**

	Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions in terms of loss and gain of electrons and change in oxidation number, applications of redox reactions in permanganometry and dichromatometry.
11)	**Electrochemistry** Conductance in electrolytic solutions, specific and molar conductivity, variation of conductivity with concentration, Kohlrausch's law, electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells, emf of a cell, standard electrode potential, Nernst equation and its application to chemical cells, relation between Gibbs free energy change and emf of a cell, fuel cells, Li-ion battery.
12)	**Organic Chemistry: Some Basic Principles** General introduction, classification and IUPAC nomenclature of organic compounds. Electronic displacements in a covalent bond: inductive effect, resonance and hyperconjugation. Homolytic and heterolytic fission of covalent bonds: free radicals, carbocations and carbanions, electrophiles and nucleophiles. Types of organic reactions: elementary idea of addition, elimination and substitution reactions.
13)	**Hydrocarbons: Classification of Hydrocarbons** Alkanes –Nomenclature, isomerism, conformations (ethane only), physical properties (up to 6 carbons) and chemical reactions including halogenations, free radical mechanism, combustion and pyrolysis. Alkenes – Nomenclature, structure of double bond (ethene), geometrical isomerism, physical properties (up to 3 carbons) and methods of preparation. Chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis and oxidation. Mechanism of electrophilic addition. Alkynes – Nomenclature, structure of triple bond (ethyne), physical and chemical properties (up to 3 carbons) and preparation, Chemical reactions; addition of hydrogen, halogens, hydrogen halides and water. Aromatic hydrocarbons – Introduction, IUPAC nomenclature. Benzene; resonance, Hückel's rule and aromaticity, chemical properties, mechanism of electrophilic substitution – nitration, sulphonation, halogenations, Friedel-Crafts alkylation and acylation.

14)	**Haloalkanes and Haloarenes** **Haloalkanes:** Nomenclature, nature of C-X bond, physical and chemical properties, and mechanism of substitution reactions. Stability of carbocations. *R/S* and *D/L* configurations. Uses and environmental effects of dichloromethane, trichloromethane, tetrachloromethane, iodoform, and freons.
15)	**Haloarenes:** Nature of C-X bond, substitution reaction (directive influence of halogen for monosubstituted compounds only), stability of carbocations. Uses and environmental effects of DDT.
16)	**Alcohols, Phenols and Ethers** **Alcohols:** Nomenclature, methods of preparation, physical and chemical properties (primary alcohols only), identification of primary, secondary and tertiary alcohols, mechanism of dehydration, uses of methanol and ethanol.
17)	**Phenols:** Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenols, electrophilic substitution reaction, and uses of phenolic compounds.
18)	**Ethers:** Nomenclature, methods of preparation, physical and chemical properties, and uses.
19)	**Aldehydes, Ketones and Carboxylic Acids** **Aldehydes and Ketones:** Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes, and uses.
20)	**Carboxylic Acids:** Nomenclature, acidic nature, methods of preparation, physical and chemical properties, and uses.
21)	**Organic compounds containing Nitrogen**
22)	**Nitro compounds:** General methods of preparation and reduction reactions. **Amines:**

	Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines.
23)	**Cyanides and Isocyanides:** Nomenclature, structure, methods of preparation, and chemical reactions (hydrolysis and reduction reactions only).
24)	**Diazonium salts:** Preparations, chemical reactions and importance in synthetic organic chemistry.
	Biomolecules
25)	**Carbohydrates:** Classification (aldoses and ketoses), monosaccharides (glucose and fructose), D/L configuration, oligosaccharides (sucrose), polysaccharides (starch, cellulose)
26)	**Proteins:** Elementary idea of α-amino acids, zwitterionic structures of amino acids, peptide bonds, polypeptides, structure of proteins (primary structure only), denaturation of proteins, and enzymes.
27)	**Nucleic Acids:** DNA & RNA (introduction and basic concept)
28)	**Polymers** Classification (natural and synthetic), methods of polymerisation (addition and condensation), and copolymerization. Some important polymers like polythene, nylon, polyesters, Bakelite, and rubber. Biodegradable and non- biodegradable polymers.
29)	***s*-Block Elements (Group 1 and Group 2 elements)** Electronic configuration, occurrence, trends in the variation of properties (such as ionization enthalpy, atomic and ionic radii), trends in chemical reactivity with oxygen, water, hydrogen and halogens, hydrides (ionic, covalent and interstitial), hydrogen peroxide (preparation, properties, structure & use), hydrogen as a fuel. Biological importance of Na, K, Mg, and Ca.
30)	***p*-Block Elements**

	General introduction to *p*-block elements, electronic configuration, occurrence, variation in properties, oxidation states, and trends in chemical reactivity.
31)	**Group 13**: Boron-physical and chemical properties of compounds of Boron, boron oxides, boric acid, borates, B_2H_6 and inorganic graphite. Aluminum: Reactions of Al with acid and alkali, uses of Al, preparation and uses of $LiAlH_4$ and Al_2O_3. **Group 14:** Carbon: Catenation, allotropic forms, nano carbon, graphene, physical and chemical properties of two oxides of carbon- CO and CO_2, Silicon: Some compounds of silicon and their important uses –silicon tetrachloride (structure, preparation, hydrolysis and reduction reaction only), silicates [structure of open chain silicates constructing of $(SiO_3)_n^{2n-}$ ions], use of zeolites. **Group 15 :** General introduction, electronic configuration, occurrence, oxidation states. Structure and reaction of NH_3, HNO_3, NCl_3, oxides of nitrogen (structures only). Phosphorus – allotropic forms (white and red), preparation and properties of phosphine, phosphorus halides (PCl_3 and PCl_5) and oxoacids (elementary idea only). **Group 16:** General introduction, electronic configuration, occurrence, oxidation states. Oxygen-classification of oxides. Preparation and properties of ozone. Sulphur-allotropic forms (rhombic and monoclinic). Properties and uses of oxides, oxoacids and peracids of Sulphur. **Group 17:** General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties. Compounds of halogen- preparation, structure and uses of oxides, oxoacids of halogens, interhalogen compounds. Elementary idea of pseudohalogens and polyhalides. **Group 18:** General introduction, electronic configuration, occurrence, and uses of noble gases. Preparation, structure and chemical reactions of XeO_2, XeO_3, XeF_2, XeF_4, XeF_6, $XeOF_2$.
32)	***d* and *f* Block Elements** General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first-row transition metals – ionic radii, ionisation enthalpy, oxidation states, colour, catalytic and magnetic properties. Preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$.

33)	**Lanthanoids:** Electronic configuration, oxidation states, chemical reactivity, lanthanoid contraction and its consequences, uses.
34)	**Actinoids:** Electronic configuration, oxidation states, comparison with lanthanoids, uses.
35)	**Coordination Compounds** Introduction, ligands, classification of ligands based on denticity and field strength, coordination number, colour, and magnetic properties. IUPAC nomenclature of mononuclear coordination compounds, EAN rule, Bonding (Werner's theory, VBT and CFT), CFSE, structural-isomerism and stereo- isomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological systems)
36)	**Environmental Chemistry** Environmental pollution – air, water and soil pollution (cause and effects), primary and secondary pollutants (solid and liquid), chemical reactions in the atmosphere, smog, pollution due to industrial wastes, solid waste management (elementary idea only), SPM, RSPM, green chemistry as an alternative tool for reducing pollution. Water preservation and protection. Strategy for control of environmental pollution.
37)	**Qualitative and Quantitative Analysis** Detection of special elements (N, S, halogens) in organic compounds by the Lassaigne test. Identification of the following functional groups present in organic compounds: primary aromatic amine, aldehyde, ketone, carboxylic acid and unsaturation. Calculations based on acid-based and redox titration (dichromatometry and pernanganometry). Detection of water-soluble non-interfering acid and basic radicals by dry and wet tests among the following: Acid radicals: Cl^-, S^{2-}, SO_4^{2-}, NO_2^-, NO_3^-, CO_3^{2-} Basic radicals: Cu^{2+}, Al^{3+}, Fe^{2+}, Fe^{3+}, Zn^{2+}, Ca^{2+}, Mg^{2+}, Na^+, NH_4^+