

Physics

Vectors: Vector Revision, Component of Vectors, rectangular components, expressing a vector in rectangular components, independence of rectangular components, application of rectangular components in vector algebra, unit vector applications, Product of Vectors, application of dot product and cross product

Calculus: Constant and Variables, Basic Functions, Slope and Gradient on graphs, Differential calculus rules and application in kinematics, Integral calculus, area under the curve and application in kinematics.

Kinematics : Revision Kinematics, Projectile Motion

Dynamics : Revision Newton's Laws of Motion (NLM), Application of NLM in a plane, motion on incline, uniform circular motion

Chemistry

Basics of Chemistry: Energy change in a chemical process - exothermic and endothermic nature of a process, Exo and Endo in terms of bond breaking and formation; Exo and endo in terms of attractions and repulsions; Exo and endo in terms of stability of reaction species; Intermolecular forces (IMF) and phases of matter, Heating effect on phases of matter, phase transition and boiling point and melting point and their relation with IMF, Latent heat and its applications, Units of heat and energy, concept of thermal equilibrium, concept of conservation of energy, specific heat capacity and application in phase transition - application in numericals (learning problem solving approach)

Mole Concept: Dalton's atomic theory, Elements, molecules and compounds, Relative atomic weights, definition of amu/u, Isotopes, isobars, isotones, Avogadro's number and definition of mole, Gram atomic mass and gram molecular mass, Relation of mole with number of particles, mass and volume at STP, Numerical application based on mole concept (learning problem solving approach)

Atomic Structure: Cathode ray experiment (observations and conclusions), Anode ray experiment (observations and conclusions), Plum pudding model, Rutherford's alpha particle scattering experiment (observations and conclusions), Bohr atomic model and introduction to quantization, Electronic configuration based on Bohr model, Concept of valence shell, valence electrons, valency and covalency, arranging first 20 elements on basis of configuration, Noble gases and octet/duplet rule,

Oxidation state (OS): OS in ionic compounds, OS in covalent compounds using structure, Rules for finding OS, formula for finding OS when structure is not known; Oxidation and reduction on the basis of OS; oxidizing agent (OA) and reducing agent (RA) on the basis of OS; Balancing redox reactions (half reaction method) - balancing in acidic medium and basic medium, Nomenclature of common oxyacids (using OS as reference) of Cl, S, N, P; Nomenclature of anions from oxyacids, Pyro and meta acids; Electrochemical series and its applications to oxidation and reduction; Redox properties of halogens

Chemistry

Organic Chemistry - Classification of organic compounds on the basis of - 1. Acyclic and cyclic compounds, 2. Functional groups, Bond line structure of an organic compound, concept of hidden hydrogens, Degree of C and H in a compound, Degree of a functional group in a compound, Greek letter notation of C's in a compound, IUPAC nomenclature (alkanes, alkenes, alkynes and alkyl halides - cyclic and acyclic), reactions of different compounds (preparation and properties) - based on school textbook

Logic building - Using equations from Chemistry and applying concepts of ratio proportion and graphs - straight line, hyperbolic, parabolic, exponential and logarithmic curves graphs.

Maths

Real number: Divisibility, Euclid's division lemma, Euclid's division algorithm, The fundamental theorem of arithmetic, Some application of the fundamental theorem of arithmetic,

Polynomials: Recapitulation between zeros and coefficients of quadratic polynomials, statements and simple problems on division algorithm, polynomials with real coefficients.

Pair of linear equations in two variables: Pair of linear equations in two variables and graphical method of their solutions, consistency/inconsistency, algebraic condition for number of solutions, solutions of a pair of linear equations in two variables algebraically, simple problems on equations reducible to linear equations,

Quadratic equations: Standard form of a quadratic equation, solution of quadratic equation by factorization, and by using quadratic formula, situational problems based on quadratic.

Arithmetic progression : Motivation for studying arithmetic progression derivation of the n th term and sum of the first n terms of A.P.

Triangles : Concept of similarity, Similar polygons, similar triangles and their properties, some basic results on proportionality, internal and external bisectors of an angle of a triangle, more on basic proportionality theorem, Criteria for similarity of triangles, more on characteristic properties, Areas of two similar triangles, Pythagoras theorem,

Trigonometric Ratios : Angle, Trigonometric ratios, Relations between trigonometric ratios, Trigonometric ratios of some specific angles, Trigonometric ratios of 0° and 90° , Trigonometric ratios of complementary angles,

Trigonometric Identities : Trigonometric identities, Values of trigonometric ratios in terms of the value of one of them,

Maths

Circles : Secant and tangent, Some properties of tangent to a circle, Tangent from a point on a circle,

Some Application of Trigonometry : Angles of elevation and depression,

Probability : Theoretical approach to probability, Theoretical probability of an event,

Co-ordinate Geometry : Recapitulation, Distance between two points, Some applications of section formula, Area of a triangle,

Areas Related to circles : Review of perimeter and area of a circle, Sector of a circle and its area, Segment of a circle and its area, Areas of combinations of plane figures,

Surface areas and Volume : Some useful formula, Conversion of solids,

LOGIC



Arithmetic Uniformity : Application of odd and even parity in deductive reasoning.

Categorization: Drawer Principle and its applications.

Logical Puzzles and Games

Advanced Inductive Reasoning

Invariants

