

**MATHEMATICS**

**Differential Calculus:-** Differentiation of various functions and its Properties, Successive differentiation, Partial differentiation, Indeterminate forms, Taylor's series, Maxima and Minima of functions of one as well two variables.

**Integral Calculus:-** Integration of various functions, Important properties of definite integrals, applications to calculate length, area, volume and surface area of revolution of curves.

**Complex Trigonometry:-** Complex Numbers and its properties, Hyperbolic functions of a complex variable, logarithmic function of a complex variable.

**Differential Equations:-** Ordinary differential equations of 1<sup>st</sup> order Variable separable form homogenous equations, equations reducible to separable form, Linear, Bernoulli's and exact differential equations. Higher order linear differential equations. Partial differential equations of first and higher order. Linear and non-linear partial differential equation of 1<sup>st</sup> order, Homogeneous and non-homogeneous partial differential equations.

**Matrices:-** Matrices and determinants with important properties, Rank of a matrix, normal forms, Linearly dependent and Independent vectors, system of linear equations, Cayley Hamilton Theorem, Eigen values and Eigen vectors.

**CHEMISTRY**

**SOLUTIONS:** Concept of homogenous solution, Ionization, Acidity, Basicity, Equivalent weight, Normality, Molarity and Molality.

**ELECTROLYSIS:** Electrolytes and non-electrolytes, Conductors and non-conductors, Electrolysis, lead acid battery and Ni-Cd battery with special reference to their reaction mechanism.

**POLYMERS:** Classification, Methods of polymerization, Polythene, Polyester and Nylon.

**DRUGS:** Antipyretics, Tranquillizers and Antibiotics

**WATER TREATMENT:** Introduction, Types of Water and softening of Water by different processes; priming and foaming, Sludge and scale formation, Determination of hardness by Soap titration and EDTA methods.

**ENVIRONMENTAL CHEMISTRY:** Concept of environmental Chemistry, segments of environment, Air pollution and Water pollution.

**PHYSICS**

Scalar and Vector quantities, Scalar and Vector fields, concepts of Gradient of a scalar field, Divergence and Curl of Vector fields, Laplacian, Laplace's and Poisson's equations.

Electric field, Electric flux, Gauss Law and applications, Biot -Savart's Law, Ampere's Law, Electromagnetic Induction, Faraday's Laws, Electromagnetic spectrum, Electromagnetic Waves. Interference, Diffraction and Polarization (concepts only)

Definition of Simple harmonic motion, Relation for the displacement, velocity, acceleration and time period of a body executing SHM, Free, forced and resonant vibrations.

Black Body radiation-Stefan's Law, Kirchhoff's Law, Wien's Law.

Matter Waves, De-Broglie relation, Uncertainty principle, Schrodinger's equation and its application to one dimensional problem.

Energy Bands in Solids, conductor, Insulator and semiconductors, P-N junction diode, solar cell, function transistor, Logic gates (OR, AND, NOT, NAND AND NOR)

Concepts of Lasers and optical fibers, Principal of Laser Action, propagation of light in optical fibers.

Concepts of Relativity, Frames of Reference, Mass-energy equivalence.

Projectile Motion, Circular motion

Elasticity, Pressure, Surface Tension, Viscosity.