MATHEMATICS
PAPER - I

Algebra : Algebra of sets, relations and functions, Groups, Sub-Groups, costes & their Properties, Lagrange's theorem on the order of a sub-group of a finite group, normal sub-groups cyclic groups, permutation groups, quotient groups homomorphism & isomorphism of groups Ringe integral domaine & fields, sub ringe & ideals, homomorphism & isomorphism of ringe.

Matrics over the field real numbers, different types of matrices, addition & scaler multiplication of matrices, the determinant of a square matrix, minors and co-factors, Jacobit's theorem, transpose of a matrix, adjoint matrix, reciprocal (inverse)matrix,singular and nonsingular matrics, multiplication of matrices & determinate, groups & ringes of matrices, rank of a matrix, solution of a system of linear equations.

Inequalities, Relation between roots & co-efficients of a polynominal equation, symmetic functions of rootes, Cardon's methods of solution of cubic.

Covergence & divergence of sequences and series, camparision test, ratio & Rabbe's test for convergence of infinite series.

Calculus : Real - Valued functions of a real variable bounds, limits & continuity of functions, Manotonic functions, inverse functions, properties of continuous functions.

Successive differentiation, Laibnitz theorem, Rolle's theorm, Lagrange's Mean-value theorem, Taylor's & Machlaurims theorem with Lagrange's form of remainder in determinate form.

Functions of two or more variable, partial differentiation, Evler's theorem on hemogenous functions, Maxima & minima of a function of two variables.

Standard integrals, Properties of definite integrals, elementary idea of improper integrals.

Tangents and normal, curvature of plane curves rectification of plane curver, quadrature, surfaces and volumes of solids of revolution.

Differential Equations :

Formation of differential equation, equations of 1st order and 1st degree, Clairaut's form, linear equation of 2nd and higher orders with constant coefficients, complementary function and particular intergrals in standard cases.

Complex Analysis :

Algebra of complex numbers, absolute value and argument of complex numbers, Representation of complex numbers by points on a plane, complex number represented algebric operations. Geometrical interpretation of 3_b Straight lines and circles in terms of complex numbers

Topology :

Difinition and examples of metric spaces, usual metric on $R.R^2$ and R^3, Open and closed sets and their properties, Continuous mappings, Sequence in a metric space, Complete metric spaces, Completeness of R, Definition and examples of topological spaces, indiscrete, discrete and cofinite topologie. Intersection and union of topologies, metric space as a topological space. Usual topology on $R.R^2$ and R^3, Continuous mapping and homomorphism.

MATHEMATICS

PAPER - II

Coordinate Geometry :

Change of axes, invariant part of straight lines, General equation of the second degree, central and non central conics, tengent, normal, chord of contact, pole polar, polar equation of conic and equations of its chord, tangent and normal

Polar & cylindrical coordinates in three dimensions S.D. between two lines, Sphere, Cone and Cylinder.

Vectors :

Triple product of vector with applications, vector equations of lines, planes, sphere, Differentiation of Vector Functions and simnple applications.

Trigonometry :

De Moivere's theorem, Geogory's series, Expansion of sine and cosine function and Hyperbolic function.

Statics :

Coplanar forces, conditions of equilibrium, centre of gravity, including C.G. of compound bodies, simple machines.

Dynamics :

Relative velocity, Rectilinear motion with variable acceleration, simple Harmonic Mition, Projectiles, Reugean and inclined plane. Angular velocity. Tangential and normal accelerations, Motion inside and outside of a smooth vertical circle. Simple pendulum, Impulse, works & energy. Impulsive forces, Principle of enegry. Conservation of energy & linear momentum, Direct impact of elastic bodies.

Spherical Trigonometry and Astronomy :

Spherical triangle and its properties : the sine formula, cosine formula, four parts formula, sinecosine formula.

Celestial sphere, three systems of colestial coordinates, sidereal time, relation between R.A. and H.A., altitude of a body on the meridian, altitude of the celestial pole rising and setting of stars, circumpolar stars, annual motion of the sun, equinoxes, solstices, Planetary motion, synodic and orbital periods, Kepler's laws, Geocentic parallax, annual parallax, Eclipses, maximum and minimum number of eclipses in a year.