MATHEMATICS-I (proposed)

I. PARTIAL DIFFERENTIATION AND ITS APPLICATIONS
Functions of two or more variables, partial derivatives, Homogeneous functions-Euler’s theorem, total derivative, differentiation of implicit functions, geometrical interpretation-tangent plane and normal to a surface, change of variables, Jacobians, Taylor’s theorem for functions of two variables, errors and approximations, total differential, maxima and minima of functions of two variables, Lagrange’s method of undetermined multipliers, differentiation under the integral sign-Leibnitz rules.

II. SOLID GEOMETRY
Equation of a plane, equations of straight line, condition for a line to lie in a plane, coplanar lines, shortest distance between two lines, intersection of three planes, equation of sphere, tangent plane to a sphere, cone, cylinder, quadric surfaces.

III. MULTIPLE INTEGRALS AND THEIR APPLICATIONS
Double integrals, change of order of integration, Double integrals in polar coordinates, areas enclosed by plane curves, triple integrals, volumes of solids, change of variables, area of a curved surface, calculation of mass, centre of gravity, centre of pressure, Moment of inertia, product of inertia, principal axes, Beta function, Gamma function, relation between Beta and Gamma functions, Error function or probability integral.

IV. INFINITE SERIES
Definitions, convergence, divergence and oscillation of a series, general properties, series of positive terms, comparison test, Integral test, D-Alembert’s Ratio test, Raabe’s test, Logarithmic test, Cauchy’s root test, Alternating series- Leibnitz’s rule, series of positive or negative terms, power series, convergence of Exponential, Logarithmic and Binomial series, Uniform convergence, Weirstrass M-test, Properties of Uniformly convergent series. (All tests without proofs)

V. FOURIER SERIES
Euler’s formulœ, conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Odd and Even periodic functions-Expansions of Odd and Even periodic functions, Half-range Series, Parseval’s Formula, Practical Harmonic Analysis.

TEXT BOOKS:

REFERENCE BOOKS: