Paper II

Calculus

Unit – I

Series:

Infinite series, convergent series, tests for convergence of a series, comparison test, Cauchy's nth root test, D' Alembert's ratio test, Logarithmic ratio test, De – Morgan and Bertand's test. Cauchy's Condensation test, Gauss's test (Derivation of tests are not required). Alternating series, Leibnitz's test for alternating series, Absolute convergence.

Unit – II

Taylor's theorem, Maclaurin's theorem, Power series expansion of a function. Power series expansion of sinx, cosx, e^x, $Log_e (1 + x)$, and $(1 + x)^n$.

Unit – III

Derivative of length of an are and Pedal equations for Cartesian and polar equations of curves.

Unit – IV

Curature:

Radius of curvature for Cartesian equation of curves, for intrinsic equation of curves, for parametric equation of curves, for polar equation of curves and for pedal equation of curves.

Unit – V

Partial Differentiation:

Partial Derivatives, Euler's theorem, for homogeneous functions, chain rules, differentiation of implicit functions.

Unit- VI

Maxima and Minima:

Maxima and Minima for functions of one and two variables.

Unit – VII

Asymptotes:

Asymptotes for Cartesian and polar curves.

Unit – VIII

Curve tracing:

Multiple points, curves tracing of simple curves (Cartesian and polar co-ordinates).

Unit – IX

Envelopes:

Family of curves, definition of envelope, method of finding the envelope, to find the envelope when two parameters are connected by a relation.

Unit – X

Area of plane curves:

Area of Cartesian and polar curves, area of closed curves.

Unit – XI

Length of curves, intrinsic equation of a curve, intrinsic equation of curve from Cartesian, polar and parametric equation of curves.

Unit – XII

Volumes and surface of solids of revolution.

Unit – XIII

Double integral:

Concept and evaluation of double integral in Cartesian and polar co-ordinates, change of order of integration.

Unit – XIV

Triple integrals and Dirichler's integral.

Unit – XV

Beta, gamma functions and their simple properties.