

2126

**SECOND YEAR
B. A. MATHEMATICS
PAPER – I
ADVANCED CALCULUS**

Duration: 3 Hours

Max. Marks: 70

UNIT - I

Continuity: Cauchy definition of continuity of a function of one variable, Notion of limit and continuity of function of two variable (Not Theorems), discontinuous functions and their kinds, Properties of continuous functions at a point and in closed intervals. Derivability: Differentiable functions and their properties including Darboux theorem, Examples of continuous and differentiable functions.

UNIT - II

Partial differentiations, envelopes and evolutes, Maxima and Minima of two variables and more than two variables including Lagrange's method of undetermined multipliers.

UNIT -III

Evaluation of double and triple integrals, Dirichlet's theorem and Liouville's extension, change of order of integration and volume and surface of solid of revolution.

UNIT - IV

Jacobians, change of independent variables. Vector Calculus: Direction of derivatives, gradient of scalar functions, irrotational Vectors, definition of gradient, divergence of a vector, curl of a vector, curl of the product of a scalar and vector, divergence of a vector product.

UNIT - V

Vector Integration: Gauss's theorem, divergence of the product of a scalar and a vector, Stoke's theorem, surface integral of the curl of a vector, Green's theorem (Excluding the proofs of the theorems)

References:

1. Gorakh Prasad : Differential calculus, Pothishala Pvt. Ltd., Allahabad.
2. Gorakh Prasad : Integral calculus, Pothishala Pvt. Ltd., Allahabad.
3. Malik, S.C. : Mathematical Analysis, Wiley Eastern Ltd., New Delhi
4. Shanti Narayan : A Course of Mathematical Analysis, S. Chand and Company, New Delhi.
5. Jain, P.K. and : An Introduction to Real Analysis by, S. Chand and Company, New Delhi.
6. Kaushik, S.K. : Principles of Mathematical Analysis.
7. Walter Rudin : A first course in Real Analysis.
8. Sharma Purohit : Elements of Real Analysis.
9. Bhargava, Goyal : Real Analysis.
10. Sharma, Gokhroo : Real Analysis.
11. Spain, B. : Vector Analysis.
12. Bhargava, Banwari Lal : Sadish Kalan.
13. Gokhroo, Saini : Sadish Kalan.