

## **Main Topics**

### **(Detailed Contents )**

**(295 Stat)**

## **Numbers:**

Set of Real Numbers- Rational and Irrational numbers – Greatest lower bound and least upper bound of real numbers- Point sets- Intervals and Neighborhood – Nested intervals- (Bolzano- Weierstrass Theorem-- without proof).

## **Limits and Continuity:**

Right- hand and Left –hand limits- Properties of limits- Continuous Functions- Intermediate Value Theorem- Limits Involving Infinity.

## **Functions of Several Variables:**

Limits and continuity-Partial Derivatives- Second Partial Derivatives- Derivatives of Homogeneous Functions with degree  $m$  – Euler theorem of Homogeneous Functions- Partial Derivatives from high order - Derivatives of Explicit Functions from high order. Change of Variables.

## **Integrals:**

Definition and Properties of Riemann Integrals – Integration of continuous functions- Fundamental theorem of calculus- Mean value theorem for definite integral – Differentiation under Integration symbol(Relationship between derivatives and definite integrals) – Multiple integrals- Double integrals in Polar coordinates- Surface Area - Change of variables and Jacobians in Multiple integrals.

## **Sequences & Infinite series and Power series:**

Concepts of Convergent or Divergent Series- concept of Cauchy convergence - Infinite series- The Ratio, Roots and integral tests of Convergent Series- Absolute and Uniform convergence for positive series- Power series and their applications – Power series representations of functions- Maclaurin and Taylor Series – Lagrange's multipliers. Euler's functions- Relations between Gamma and Beta functions- Incomplete Beta function.

## **Differential Equations:**

Separable differential equations- First order Linear differential equations- Introduction of Difference Equations.