

MAJOR PAPER VI – REAL ANALYSIS

Unit I

Real number system – field axioms – order relations in \mathbb{R} - absolute value of a real number and its properties – supremum and infimum of a set – order completeness property – countable and uncountable sets

Unit II

Neighbourhoods – open and closed sets – limit points – sequences – convergent, divergent and oscillatory – cauchy sequences – important limit theorems. Infinite series – Cauchy’s general principle of convergence – Geometric series – Tests of convergence – Comparison Test, Root Test, D’Alembig’s Test and Raahis Test only

Unit III

Continuous functions – limit of functions – Algebra of limits – continuity of a function – types of discontinuities – elementary properties of continuous functions and uniform continuity of a function

Unit IV

Differentiability of a function – derivability and continuity – Algebra of derivatives – inverse functions theorem – Darbouse’s theorem on derivatives – Rolle’s Theorem – mean value theorems on derivatives – Taylor’s theorem with remainder

Unit V

Riemann integration – definition – Darbou’s theorem – conditions for integrability – integrability of continuous and monotonic functions – properties of integrable functions, integral functions, continuing and derivability of integral functions – the first mean value theorem and the fundamental theorem of calculus

Text Books:

1. M.K. Singhal and Asha Singhal – Chand & Co. New Delhi (5th Edn. 1978) Chapter 3 to 9 {For Unit I, II, III & IV - Scope and treatment as in first course in Real Analysis}
2. Shanti Narayan–A course of Mathematical Analysis–Chapter IV (for Unit – V)
3. Chatterjee- Real Analysis, Chand & Company