

B.A./B.Sc. III
(From 2013-14 onwards)

Paper I: REAL ANALYSIS

M.M.: 60

Unit 1. Axiomatic study of real numbers, Completeness property in \mathbb{R} , Archimedean property, Countable and uncountable sets, Neighbourhood, Interior points, Limit points, Open and closed sets, Derived sets, Dense sets, Perfect sets, Bolzano-Weierstrass theorem.

Unit 2. Sequences of real numbers, Subsequences, Bounded and monotonic sequences, Convergent sequences, Cauchy's theorems on limit. Cauchy sequence, Cauchy's general principle of convergence, Uniform convergence of sequences and series of functions. Weierstrass M-test, Abel's and Dirichlet's tests.

Unit 3. Sequential continuity, Boundedness and intermediate value properties of continuous functions, Uniform continuity, Meaning of sign of derivative, Darboux theorem. Limit and continuity of functions of two variables, Taylor's theorem for functions of two variables, Maxima and minima of functions of three variables, Lagrange's method of undetermined multipliers.

Unit 4. Riemann integral, Integrability of continuous and monotonic functions, Fundamental theorem of integral calculus, Mean value theorems of integral calculus, Improper integrals and their convergence, Comparison test, μ -test, Abel's test, Dirichlet's test, Integral as a function of a parameter and its differentiability and integrability.

Unit 5. Definition and examples of metric spaces, Neighbourhoods, Interior points, Limit points, Open and closed sets, Subspaces, Convergent and Cauchy sequences, Completeness, Cantor's intersection theorem.

Paper II: COMPLEX ANALYSIS

M.M.: 60

Unit 1. Functions of a complex variable, Concepts of limit, continuity and differentiability of complex functions, Analytic functions, Cauchy- Riemann equations (Cartesian and polar form), Harmonic functions, Orthogonal system, Power series as an analytic function.

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R.B. Srinivasan
13.07.2011

R.B. Srinivasan

