

BM-241
(Semester-IV)
Sequences and Series

External Marks: 40/27

Internal Marks: 10/6

Time: 3 Hours

Note: Paper setter will set nine questions in all, selecting two questions from each section and one Compulsory question consisting of five parts distributed over all four sections. Candidates are required To attempt five questions, selecting at least one question from each section and the compulsory Question.

Section-I

Boundedness of the set of real numbers; least upper bound, greatest lower bound of a set, neighborhoods, interior points, isolated points, limit points, open sets, closed set, interior of a set, closure of a set in real numbers and their properties. Bolzano- Weierstrass theorem, Open covers, Compact sets and Heine-Borel Theorem.

Section-II

Sequence: Real Sequences and their convergence, Theorem on limits of sequence, Bounded and monotonic sequences, Cauchy's sequence, Cauchy general principle of convergence, Subsequences, Subsequential limits. Infinite series: Convergence and divergence of Infinite Series, Comparison Tests of positive terms Infinite series, Cauchy's general principle of Convergence of series, Convergence and divergence of geometric series, Hyper Harmonic series or p-series.

Section-III

Infinite series: D-Alembert's ratio test, Raabe's test, Logarithmic test, de Morgan and Bertrand's test, Cauchy's Nth root test, Gauss Test, Cauchy's integral test, Cauchy's condensation test.

Section-IV

Alternating series, Leibnitz's test, absolute and conditional convergence, Arbitrary series: Abel's lemma, Abel's test, Dirichlet's test, Insertion and removal of parenthesis, rearrangement of terms in a series, Dirichlet's theorem, Riemann's Re-arrangement theorem, Pringsheim's theorem (statement only), Multiplication of series, Cauchy product of series, (definitions and examples only) Convergence and absolute convergence of infinite products.

REFERENCES

- R.R. Goldberg : Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970
- S.C. Malik : Mathematical Analysis, Wiley Eastern Ltd., Allahabad.
- Shanti Narayan : A Course in Mathematical Analysis, S.Chand and company, New Delhi
- Murray, R. Spiegel : Theory and Problems of Advanced Calculus, Schaum Publishing co., New York
- T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985
- Earl D. Rainville, Infinite Series, The Macmillan Co., New York