

*New College*

# Sequences and Series

B.A / B.Sc - II  
Semester - IV

**JEEVANSONS PUBLICATIONS**



# SYLLABUS

**B.A. / B.Sc. 2nd Year**

**FOURTH SEMESTER**

**SEQUENCES AND SERIES : (BM - 241)**

**K.U., Kurukshetra & C.D.L.U., Sirsa**

Maximum Marks :  $\begin{cases} \text{B.Sc. : 40} \\ \text{B.A. : 27} \end{cases}$

**Note.** *The examiner is requested to set **nine questions** in all, selecting two questions from each section and **one compulsory question** consisting of five or six parts distributed over all the four sections. Candidates are required to attempt **five questions in all**, 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, neighbourhoods, 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, Theorems 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  $n$ th 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, re-arrangement 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.



# SYLLABUS

**B.A. / B.Sc. 2nd Year**

**FOURTH SEMESTER**

**SEQUENCES AND SERIES : (BM - 241)**

**Maharishi Dayanand University, Rohtak**

Maximum Marks :  $\begin{cases} \text{B.Sc. : 40} \\ \text{B.A. : 27} \end{cases}$

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**Note.** *The question paper will consist of **five** sections. Each of the first four sections will contain two questions and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **six** short answer type questions without any internal choice covering the entire syllabus and shall be **compulsory**.*

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	Chapter	Pages
Unit -1	1. <i>Topology of Real Numbers</i> ✓	.... 1.1 – 1.76
Unit -2	2. <i>Sequences</i> ✓	.... 2.1 – 2.78
	3. <i>Infinite Series</i> ✗	.... 3.1 – 3.38
Unit -3	4. <i>Infinite Series (Continued)</i> ✓ <i>1 to 5 Exercise</i>	.... 4.1 – 4.56
Unit -4	5. <i>Alternating Series</i> ✓ <i>paper</i>	.... 5.1 – 5.16
	6. <i>Arbitrary Series</i> ✓ <i>math questions</i>	.... 6.1 – 6.58
	7. <i>Infinite Products</i> ✗	.... 7.1 – 7.34
	• <i>Short Answer Questions</i>	.... (i) – (vi)
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