

New College

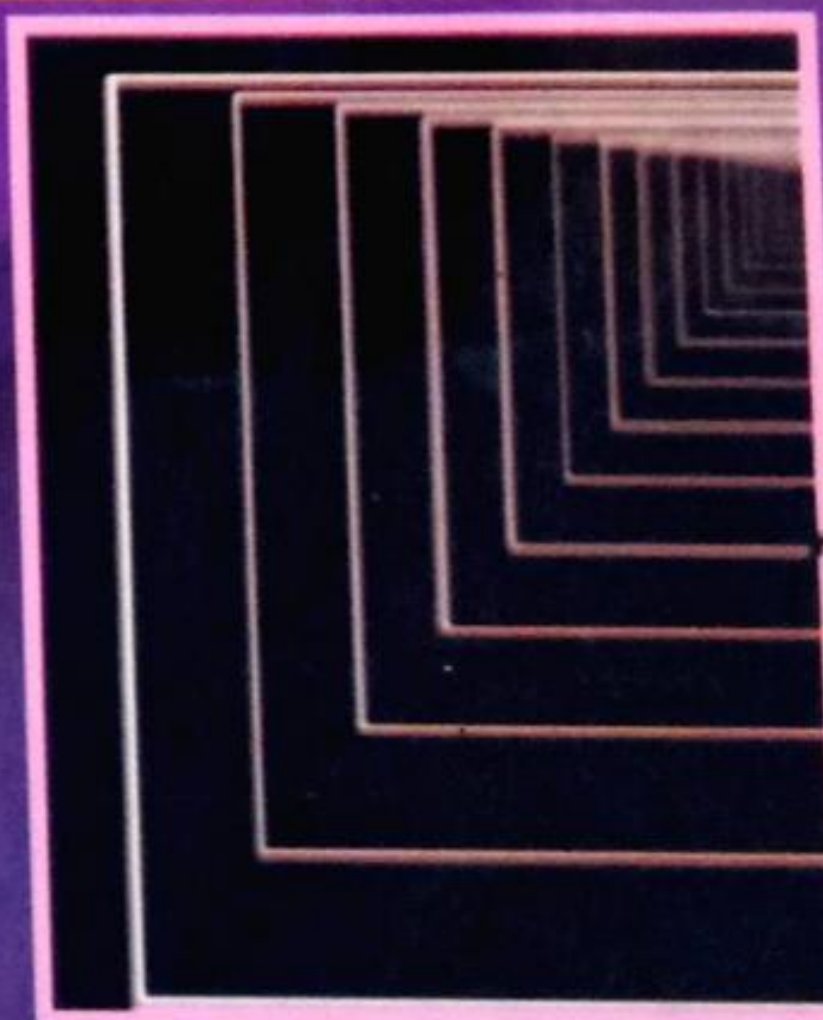
NUMBER THEORY AND TRIGONOMETRY

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



$$\left[\sum_{d|n} d(d) \right]^2 = \sum_{d|n} [d(d)]^3$$

$\sigma(n!)$



JEEVANSONS PUBLICATIONS

SYLLABUS

K.U., Kurukshetra, C.D.L.U., Sirsa and G.J.U., Hissar

B.A. / B. Sc. 1st Year

SECOND SEMESTER

NUMBER THEORY AND TRIGONOMETRY

Paper : (BM - 121)

Time Allowed : 3 hours

Maximum Marks { B.Sc. : 40
B.A. : 27

Note. The examiner is requested to set **nine questions** in all, selecting two questions from each section and one compulsory question consisting of five parts distributed over all the four sections. Candidates are required to attempt five questions, selecting at least one question from each section and compulsory question.

Section - I

Divisibility, G.C.D. (Greatest Common Divisors), L.C.M. (Least Common Multiple), Primes, Fundamental Theorem of Arithmetic. Linear Congruences, Fermat's theorem. Wilson's theorem and its converse. Linear Diophantine equations in two variables.

Section - II

Complete Residue System and Reduced Residue System modulo m . Euler ϕ function. Euler's Generalization of Fermat's theorem. Chinese Remainder Theorem. Quadratic Residues. Legendre Symbols, Lemma of Gauss; Gauss Reciprocity law. Greatest integer function $[x]$. The number of divisors and the sum of divisors of a natural number n (The functions $d(n)$ and $\sigma(n)$). Moebius Function and Moebius Inversion Formula.

Section - III

De-Moivre's theorem and its applications. Expansion of trigonometrical functions. Direct circular and hyperbolic functions and their properties.

Section - IV

Inverse circular and hyperbolic functions and their properties. Logarithm of a complex quantity. Gregory's series. Summation of Trigonometric series.

SYLLABUS

M.D.U., Rohtak, C.B.L.U., Bhiwani and I.G.U., Meerpur, Rewari

B.A. / B. Sc. 1st Year

SECOND SEMESTER

NUMBER THEORY AND TRIGONOMETRY

Paper : (BM - 121)

Time Allowed : 3 hours

Maximum Marks { B.Sc. : 40
B.A. : 27

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**.*

Section - I

Divisibility, G.C.D. (Greatest Common Divisors), L.C.M. (Least Common Multiple), Primes, Fundamental Theorem of Arithmetic. Linear Congruences, Fermat's theorem. Wilson's theorem and its converse. Linear Diophantine equations in two variables.

Section - II

Complete Residue System and Reduced Residue System modulo m . Euler ϕ function. Euler's Generalization of Fermat's theorem. Chinese Remainder Theorem. Quadratic Residues. Legendre Symbols, Lemma of Gauss; Gauss Reciprocity law. Greatest integer function $[x]$. The number of divisors and the sum of divisors of a natural number n (The functions $d(n)$ and $\sigma(n)$). Moebius Function and Moebius Inversion Formula.

Section - III

De-Moivre's theorem and its applications. Expansion of trigonometrical functions. Direct circular and hyperbolic functions and their properties.

Section - IV

Inverse circular and hyperbolic functions and their properties. Logarithm of a complex quantity. Gregory's series. Summation of Trigonometric series.

CONTENTS

<u>Chapter</u>	<u>Pages</u>
<u>NUMBER THEORY</u>	
1. ✓ Divisibility	.... 1.1 – 1.40
2. ✓ Congruences	.... 2.1 – 2.35
3. Fermat's, Wilson's and Chinese Remainder Theorem	.... 3.1 – 3.27
4. ✓ Euler's Function and Residue Systems (mod m)	.... 4.1 – 4.22
5. ✓ Some Functions of Number Theory	.... 5.1 – 5.36
6. Quadratic Residues and Quadratic Reciprocity Law	.... 6.1 – 6.44
<u>TRIGONOMETRY</u>	
7. ✓ De Moivre's Theorem and its Applications	.... 7.1 – 7.50
8. Circular Functions of a Complex Variable	.... 8.1 – 8.13
9. Hyperbolic Functions	.... 9.1 – 9.18
10. ✓ Logarithm of a Complex Quantity	.... 10.1 – 10.17
11. ✓ Inverse Circular and Inverse Hyperbolic Functions	.... 11.1 – 11.34
12. Summation of Series	.... 12.1 – 12.34
• Short Answer Questions	.... (i) – (iv)
• Question Papers	.... (v) – (xxii)