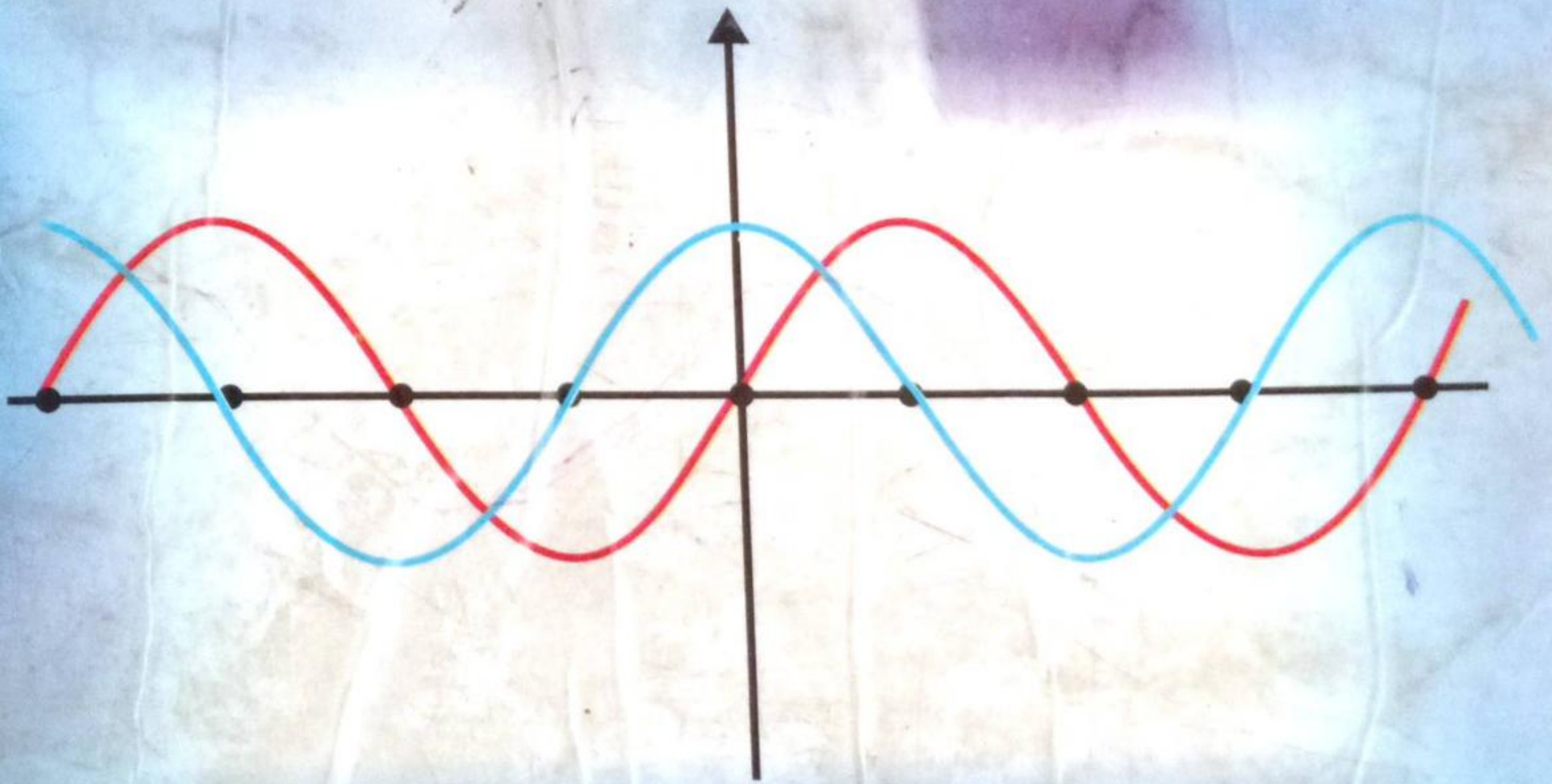


*New College*

# **SPECIAL FUNCTIONS AND INTEGRAL TRANSFORMS**

**B.A./B.Sc. II  
FOURTH SEMESTER**



**JEEVANSONS PUBLICATIONS**

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# SYLLABUS

Maharishi Dayanand University, Rohtak

**B. Sc. 2nd Year**

**FOURTH SEMESTER**

**SPECIAL FUNCTIONS AND INTEGRAL TRANSFORMS : (BM - 242)**

Maximum Marks : 45

Time Allowed : 3 Hours

## Section - I

Series solution of differential equations : Power series method, Definitions of Beta and Gamma functions, Bessel equation and its solution : Bessel functions and their properties, Convergence, Recurrence relations and generating functions, Orthogonality of Bessel functions.

## Section - II

Legendre and Hermite differential equations and their solutions : Legendre and Hermite's functions and their properties, Recurrence relations and generating functions. Orthogonality of Legendre and Hermite's polynomials, Rodrigues' Formula for Legendre and Hermite Polynomials, Laplace Integral Representation of Legendre polynomial.

## Section - III

Laplace Transforms : Existence theorem for Laplace transform, Linearity of the Laplace transforms, Shifting theorems, Laplace transforms of derivatives and integrals, Differentiation and integration of Laplace transforms, Convolution theorem, Inverse Laplace transforms, convolution theorem, Inverse Laplace transforms of derivatives and integrals, Solution of ordinary differential equations using Laplace transform.

## Section - IV

Fourier transforms : Linearity property, Shifting, Modulation, Convolution theorem, Fourier transform of derivatives, Relations between Fourier transform and Laplace transform, Parseval's identity for Fourier transforms, Solution of differential equations using Fourier transforms.

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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**.*



# SYLLABUS

Kurukshetra University, Kurukshetra

**B. Sc. 2nd Year**

**FOURTH SEMESTER**

**SPECIAL FUNCTIONS AND INTEGRAL TRANSFORMS : (BM - 242)**

Maximum Marks : 45

Time Allowed : 3 Hours

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**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**

Series solution of differential equations : Power series method, Definitions of Beta and Gamma functions, Bessel equation and its solution : Bessel functions and their properties - Convergence, Recurrence relations and generating functions, Orthogonality of Bessel functions.

## **Section - II**

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# CONTENTS

Chapter	Pages
1. Power Series	1.1 – 1.66
2. Bessel's Equation and Function	2.1 – 2.41
3. Legendre's Equation ✓	3.1 – 3.31
4. Hermite's Equation	4.1 – 4.28
5. Laplace Transforms ✓	5.1 – 5.46
6. Inverse Laplace Transforms ✓	6.1 – 6.24
7. Use of Laplace Transforms in Integral Equations	7.1 – 7.10
8. Solution of Differential Equations by Laplace Transformation ✓	8.1 – 8.16
9. Fourier Transforms ✓	9.1 – 9.42
10. Solution of Differential Equations by Fourier Transforms	10.1 – 10.15