



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-II Summer 2025	
Exam Seat No.:	
Academic Year: 2024-2025	Semester: IV
Class: SY	Program: B.Tech
Branch Code: MEC	Pattern: 2023
Name of Course: Applied Mathematics	Course Code: 2300201D
Max. Marks: 30	Duration: 1.15 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 pages.
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. Use of nonprogrammable scientific calculator is allowed.

Marks CO

Question No. 1

- 1 a) Find the Laplace transform of $f(t) = (t - 1)\sin 3t$ (3) CO1
- 1 b) Find the Fourier Transform of (4) CO1

$$f(x) = \begin{cases} 1, & |x| < 1 \\ 0, & |x| > 1 \end{cases}$$

Question No. 2

- 2 a) Find Fourier Cosine Transform of (4) CO3

$$f(x) = \begin{cases} x^2, & 0 < x < a \\ 0, & x > a \end{cases}$$

- 2 b) Find the Laplace Transform of $f(t) = e^{-2t}(3\cos 6t - 5\sin 6t)$ (4) CO3

OR

- 2 c) Find Fourier Sine Transform of (4) CO3

$$f(x) = \begin{cases} 2, & 0 < x \leq 1 \\ 0, & x > 1 \end{cases}$$

- 2 d) Find the Inverse Laplace Transform of $\frac{1}{2} \log\left(\frac{s^2+9}{s^2+4}\right)$ (4) CO3

Question No. 3

- 3 a) Find the Particular Integral of $\frac{d^2 y}{dx^2} - y = x \sin 3x$ (3) CO2

3 b) Solve, $\frac{d^2 y}{dx^2} + 6\frac{dy}{dx} + 9y = e^{-3x} \sin 3x$ (4) CO2

Question No. 4

4 a) Solve $\frac{dx}{y-z} = \frac{dy}{z-x} = \frac{dz}{x-y}$ (4) CO4

4 b) Solve $x^2 \frac{d^2 y}{dx^2} - 3x \frac{dy}{dx} + 5y = x^2$ (4) CO2

OR

4 c) Solve $\frac{dx}{dt} + y = \sin t$, $\frac{dy}{dt} + x = 0$ (4) CO4

4 d) Solve $(x+3)^2 \frac{d^2 y}{dx^2} - 4(x+3) \frac{dy}{dx} + 6y = x$ (4) CO2

..... End of question paper.....