



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

	In Sem Examination-I Winter 2023		
	Exam Seat No.:		
	Academic Year:2023-2024	Semester: III	
	Name of Programme: B.Tech. (Mechanical / R&A)	Pattern:2022	
	Name of Course: Applied Mathematics III	Course Code: SMH222501	
	Max. Marks:30	Duration:1 Hr.	

	<p>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.</p> <ol style="list-style-type: none">1. This question paper contains 2 page(s).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. The last columns indicate the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.6. Use of nonprogrammable pocket calculator is allowed.	
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Question No. 1 Attempt following Question.

- a) Calculate the Laplace Transform of $f(t) = e^{-3t} \sin^2 t$ (4) CO2

OR

- b) Calculate the Laplace Transform of $f(t) = te^{3t} \sin 2t$ (4) CO2

- c) Calculate inverse Laplace Transform of $F(s) = \frac{3s+7}{s^2-2s-3}$ (5) CO2

OR

- d) Calculate inverse Laplace Transform of $F(s) = \frac{s}{(s+2)^2+4}$ (5) CO2

- e) Solve the D.E. by using Laplace Transform
 $y''(t) + 2y'(t) + y(t) = te^{-t}$, $y(0) = 1$, $y'(0) = -2$ (6) CO3

OR

- f) Solve the D.E. by using Laplace Transform
 $y''(t) + 9y(t) = 18t$, $y(0) = 0$, $y(\pi/2) = 0$ (6) CO3

Question No. 2 Attempt following Question

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

OR

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

- c) Solve: $\frac{d^2y}{dx^2} + 4y = x\sin x$ (5) CO2

OR

- d) Solve: $x^2\frac{d^2y}{dx^2} + 3x\frac{dy}{dx} + y = \frac{1}{x}\sin(\log x)$ (5) CO2

- e) Solve by method of variation of parameter
 $\frac{d^2y}{dx^2} + y = \sec x \tan x$ (5) CO2

OR

- f) Solve: $\frac{dx}{y-z} = \frac{dy}{z-x} = \frac{dz}{x-y}$ (5) CO2