K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:I
Class:PG-I	Program:M.Tech
Branch Code:CIV	Pattern:2024
Name of Course: Structural Dynamics	Course Code:2404502
Max. Marks:60	Duration:2.50 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 02 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. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	CO
Question No. 1			
1a)	What is logarithmic decrement? Derive the equation of logarithmic decrement. Draw the curve showing peak displacements and points of tangency.	(6)	CO1
Question No. 2			
2a)	Explain the term 'Transmissibility'. State the equation of Transmissibility for response to support motion along with meaning of parameters used in the equation.	(6)	CO1
Question No. 3			
3a)	Using Duhamel's integral, determine the response of an undamped system to a rectangular pulse force of Magnitude F_o and duration t_d.	(8)	CO2, CO3
	OR		
3b)	Explain construction of response spectra for Elastic Design along with diagram.	(8)	CO2, CO3
3c)	Elaborate Numerical evaluation of Duhamel's Integral for undamped system.	(8)	CO2, CO3
	OR		
3d)	Using Duhamel's integral, determine the response of an undamped system to a Triangular force of initial magnitude F_o which reduces linearly to zero at time t_d.	(8)	CO2, CO3
Question No. 4			
4a)	Elaborate Non linear analysis by linear acceleration step by step method.	(8)	CO3, CO4
	OR		
4b)	Derive stiffness formulation of the equations of motion for a three storey shear building.	(8)	CO3, CO4
4c)	Explain elastoplastic response of structural system.	(8)	CO3, CO4

OR

4d)	Derive Orthogonality Property of the Normal Modes for two DOF system.	(8)	CO3, CO4

Question No. 5

5a)	What is base isolation? Explain types of Base Isolation Systems.	(8)	CO3, CO4

OR

5b)	Which are different techniques of vibration response control for a superstructure?	(8)	CO3, CO4
5c)	Derive an expression for natural frequency of simply supported beam. Also evaluate first five natural frequencies.	(8)	CO3, CO4

OR

5d)	Explain design and planning considerations of machine foundations.	(8)	CO3, CO4

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