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

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

InSem Examination-I Winter2025	
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:30	Duration: 1.25 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			
1 a)	a) Explain the concept and different elements of mathematical model for SDOF system. Obtain governing equation of motion. (4 marks) b) Explain prescribed or deterministic loading with examples. (3 marks)	(7)	CO1, CO3
Question No. 2			
2 a)	A vibrating mechanism is having undamped natural frequency 25 rad/sec and stiffness (spring constant) 5 x 10^6 N/m. Experimentally it was found that a force 6000N produced a relative velocity of 0.05 m/s in the damping element. Find 1) damping ratio, 2) logarithmic decrement, 3) damped period, 4) the ratio of consecutive decrement.	(8)	CO3
	OR		
2 b)	What is viscous damping? Obtain the governing equation for the motion of an critically damped and overdamped SDOF system subjected to free vibrations. Draw the nature of response.	(8)	CO3
Question No. 3			
3 a)	a) Explain Half Power Bandwidth Method with neat sketch. (4 marks) b) Explain the concept of resonance and damping at resonance. (3 marks)	(7)	CO1, CO3
Question No. 4			
4 a)	Derive the response equation for as system subjected to undamped harmonic excitations. Explain steady state response, transient response and total response graphically.	(8)	CO3
	OR		
4 b)	Explain the term 'Transmissibility', Derive the equation of transmissibility where the support of the simple oscillator is subjected to a harmonic motion us (t) = u_0 sin $\tilde{\omega}$t.	(8)	CO3

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