



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

	SUMMER-2023		
	Exam Seat No.:		
	Academic Year:2022-2023	Semester:I	
	Name of Programme:M.Tech	Pattern:2022	
	Name of Course: Structural Dynamics	Course Code:CIV225102	
	Max. Marks:60	Duration:2.50	

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 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 indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question

Question No. 1 Attempt following Question

- 1 Explain the concept and different elements of mathematical model for SDOF system. Obtain governing equation of motion. (6)

Question No. 2 Attempt following Question

- 2 What is logarithmic decrement? Derive the equation for determining it. (6)

Question No. 3 Attempt following Question

- 3.a) Using Duhamel's integral, determine the response of an undamped system to a rectangular pulse force of Magnitude P_0 and duration t_d . (8)

OR

- 3.b) Elaborate Numerical evaluation of Duhamel's Integral for undamped system (8)
- 3.c) Define Response Spectrum. Elaborate construction of Response (8)

Spectrum in general.

OR

- 3.d) Using Duhamel's integral, determine the response of an undamped system to a Triangular pulse force of initial Magnitude P_0 and duration t_d . (8)

Question No. 4 Attempt following Question

- 4.a) Elaborate Non linear analysis by step by step method with linear acceleration. (8)

OR

- 4.b) Derive stiffness formulation of the equations of motion for a three storey shear building. (8)
- 4.c) Write a short note on Newmark's method. (8)

OR

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

Question No. 5 Attempt following Question

- 5.a) Provide solution of equation of motion under free vibrations for a simply supported beam. (8)

OR

- 5.b) What is the significance of vibration isolation? Describe any one method in detail. (8)
- 5.c) Derive an expression for natural frequency of simply supported beam. Also evaluate first five natural frequencies. (8)

OR

- 5.d) Which are different techniques of vibration response control for a superstructure? (8)