

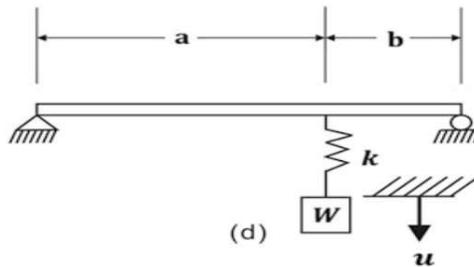


WINTER-2023		
Exam Seat No.:		
Academic Year: 2023-2024	Semester: I	
Name of Programme: M.Tech	Pattern:2022	
Name of Course: Structural Dynamics	Course Code: CIV225102	
Max. Marks:60	Duration: 2.50 Hrs	

	<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 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.	
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Question No. 1 Attempt following Question

- 1a) Determine an expression for the natural frequency for the system as shown in Fig. The beams are uniform of cross-sectional moment of inertia I and modulus of elasticity E . Neglect the mass of the beams. (6) CO 1



Question No. 2 Attempt following Question

- 2a) What is logarithmic decrement? Derive the equation for determining it. (6) CO 1

Question No. 3 Attempt following Question

- 3a) 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) CO 3

OR

- 3b) Elaborate Numerical evaluation of Duhamel's Integral for undamped system (8) CO 3

- 3c) Define Response Spectrum. Elaborate construction of Response Spectrum in general. (8) CO 2, CO 3

OR

- 3d) 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) CO 2, CO 3

Question No. 4 Attempt following Question

- 4a) Write a short note on Non linear Analysis using Wilson Theta. (8) CO 3, CO 4

OR

- 4b) Derive stiffness formulation of the equations of motion for a three storey shear building. (8) CO 3, CO 4

- 4c) Write a short note on Newmark's method. (8) CO 3, CO 4

OR

- 4d) Find natural frequencies and mode shapes for two storey shear building. (8) CO 3, CO 4

Question No. 5 Attempt following Question

- 5a) Provide solution of equation of motion under free vibrations for a simply supported beam. (8) CO 3, CO 4

OR

- 5b) Which are different types of machine foundations? Explain special considerations while planning block foundation. (8) CO 3, CO 4

- 5c) Derive an expression for natural frequency of simply supported beam. Also evaluate first five natural frequencies. (8) CO 3, CO 4

OR

- 5d) Which are different techniques of vibration response control for a superstructure? (8) CO 3, CO 4