[M19 ST 1102]

I M. Tech I Semester (R19) Regular Examinations
STRUCTURAL DYNAMICS
(STRUCTURAL ENGINEERING)
MODEL QUESTION PAPER

TIME: 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**
All questions carry equal marks
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			CO	KL	M
		UNIT - I			
1.	a).	A vertical cable 3m long has a cross section area of 4 cm^2 supports a weight of 50 KN. What will be the natural period and natural frequency of the system? $E=2.1x10^6$ kg/cm^2	2	K2	5M
	b).	Determine the natural frequency and natural period of the system consisting of a mass of 100 kg attached to a horizontal cantilever beam thrgh the linear spring K_2. The cantilever beam has a thickness of 0.8 cm and a width of 1.2 cm. $E=2.1x10^6$, L=70 cm and k =10kg/cm	2	K2	10M
		OR			
2.	a).	Explain i) Degree of Freedom ii) Damping Structures	2	K2	8M
	b).	Explain Logarithmic decrement and derive Expression for the same	2	K2	7M
		UNIT - II			
3.	a).	Derive expression for response of SDOF system subjected to un damped free vibration	2	K2	10M
	b).	A single degree of freedom system having a mass of 2.5kg is set into motion with the viscs damping and allowed to oscillate freely. The frequency of oscillation is fnd to be 20 Hz and measurement of the amplitude shows two successive amplitudes to be 6 mm and 5.5 mm. Determine the viscs damping Coefficient.	2	K2	5 m
		OR			
4.	a).	A SDOF system consists of a mass 400kg and a spring stiffness of 300KN/m.By testing it was fnd that a force of 100N Produces a relative velocity 12 cm/s. Find a) damping ratio, b) damped frequency c) logarithmic decrement and d) ratio of two consecutive amplitudes	2	K2	5M
	b).	Derive expression for response of SDOF system subjected to damped free vibration	2	K2	10M
		UNIT - III			
5.	a).	Derive the equation of motion of Multi Degree freedom systems (MDOF)	3	K2	15M
		OR			
6.	a).	State and explain orthogonality principle of normal modes	3	K2	5M
	b).	A cantilever bar is to be modelled by a mass less uniform bar to which are attached with two lumped masses representing the mass of original system as k= 2AE/L and m=ρ AL. Determine the natural frequencies and the normal modes of this model	3	K2	10M
		UNIT - IV			
7.	a).	Explain Stodola method	4	K2	5M
	b).	Explain mode Superposition method	4	K2	10M

		OR			
8.	a).	Find the natural frequencies and sketch mode shapes for uniform beams simply supported at both ends	4	K2	10M
	b).	Explain Holzer method	4	K2	5M
		UNIT - V			
9.	a).	Explain the Lumped SDOF Elastic Systems, Translational excitation	5	K2	15M
		OR			
10.	a).	Explain the Generalised co ordinate SDOF Elastic Systems, Translational Excitation	5	K2	15M

CO: Crse tcome
KL: Knowledge Level
M: Marks