Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U2601

M.E. DEGREE EXAMINATION, MAY 2024

Second Semester

Structural Engineering

21PSE202 - STRUCTURAL DYNAMICS

(Regulation 2021)

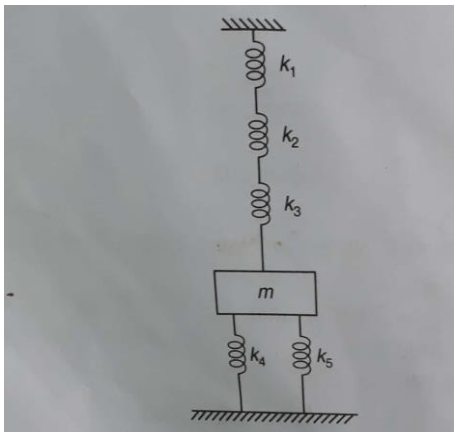
Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 20 = 100 Marks)

1.	(a)	A mass of one kg is suspended by a spring having stiffness of 600N/m. The mass is displaced downward from its equilibrium position by a distance of 0.0m. To determine a) Equation of motion in system b) Natural frequency of the system c) The response of the system as a function of time d) Total energy of the system A One kg mass is suspected by a spring having a stiffness of 1N/mm. Determine the natural frequency and static deflection of the spring.	CO2-App	(20)
		Or		
	(b)	A vibrating system consists of a mass of 6kg, spring of stiffness 80N/m and a damper with a damping co-efficient of 4 N/s/m. Determine the following: a. Damping factor b. Natural frequency of the system c. Logarithmic decrement d. The ratio of two successive amplitude	CO2-App	(20)

2. (a) Consider the system shown in fig. If K1=2000N/m, K2=1500N/m, K3=3000N/mand K4= K5 =500N/m, find the natural frequency of system and Take m= 27kg CO2-App (20)



(b) A mass of 3.5 kg is suspended by a spring having a stiffness at 700 N/m. The mass is displaced downward from its equilibrium position by a distance of 0.02 m. Estimate equation of motion, normal frequency, the response of the system and total energy. CO2-App (20)

3. (a) Suggest a suitable seating arrangement of stadium. Typical seating arrangement has the form of steps from lower level to higher level supporting on stringer beams. The span length between two beams is 25 m. Assume the properties of T section Check the safety of the cross section if the people on it are applying a load of 0.4kN/m2 with the frequency of 3Hz Check the safety of the cross section if the people on it are applying a load of 0.4kN/m^2 with the frequency of 5Hz. CO4-Ana (20)

Or

(b) Suggest suitable seating arrangements of stadium. Typical seating arrangement has the form of steps from lower level to higher level supporting on stringer beams. The span length between two beams is 10 m Assume the properties of T section, Check the safety of the cross section if the people on it are applying a load of 0.4kN/m2 with the frequency of 6Hz, Check the safety of the cross section if the people on it are applying a load of 0.4kN/m^2 with the frequency of 7Hz. CO4-Ana (20)

4.	(a)	Explain Wilson approach method towards dynamic vibration of nonlinear system.	CO1- U	(20)
		Or		
	(b)	Explain the procedure involved in finding response of damped MDOF systems.	CO1- U	(20)
5.	(a)	Explain in detail about base isolation techniques and how can reduce thevibration, while earthquake happened.	CO1- U	(20)
		Or		
	(b)	Briefly discuss about dynamic effect of moving loading? What are criteriato be followed while designing the bridge structures?	CO1- U	(20)