C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 99117

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Elective

Civil Engineering

19UCE917- STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINNERING

(Regulations 2019)

Duration: Three hours Maximum: 100 Marks

PART A - (5x 1 = 5 Marks)

Answer All Questions

1. Unit of stiffness is **…….** CO1- U

   (a) Kg-m/s^2 (b) N-s/m (c) N/m (d) N-s/m^2

2. In which system requires two independent co-ordinate to describe the motion CO2- U

   (a)Two degree (b) Single degree (c) Multiple degree (d) Three degree

3. A ---------- is the recording of ground shaking at the specific location where the location is CO3- U

   (a) seismograph (b) Seismogram

   (c) Seismic Instrumentation d) None of the these

4. Zero period acceleration is CO4- U

   (a) Period =0 (b) Amplitude =0 (c) Resonance (d) Frequency=0

5. Peak ground acceleration is measured by instrument…….. CO5- U

   (a) seismogram (b) seismograph (c) accelerographs (d) none of these

PART – B (5 x 3= 15Marks)

6. Define logarithmic decrement CO1- U
7. What is meant by mode shape? CO2- U
8. Define the term focus and epicenter. CO3- R
9. How to reduce earthquake effects on building? CO4- U

10. Define Ductility CO5- U

PART – C (5 x 16= 80Marks)

11.	(a)	Derive the equivalent stiffness of spring in parallel and series.	CO1-App	(16)
		Or		
	(b)	Derive the equation of motion for a Free Undamped SDOF system by D alembert Method.	CO1-App	(16)
12.	(a)	Determine the natural frequency and mode shapes of the following: The storey masses are m1 = 1000 kg, m2= 800 kg, h1 = 4m and h2 = 3.5m moment of inertia is 2I. take I=6x105mm^4 and E=3.5x104N/mm^2	CO2- E	(16)
		Or		
	(b)	A three storey building has seismic weights of 200 kN, 300 kN and 420 kN at I, II and III store's respectively; The corresponding stiffness's are 20000 kN/m, 25000 kN/m and 30000 kN/m. (i) Examine the model frequencies. (ii) Sketch the mode shapes	CO2- Ana	(16)
13.	(a)	Explain the measurement of earthquakes using Seismograph	CO3-U	(16)
		Or		
	(b)	Explain in detail about Elastic Rebound Theory	CO3-U	(16)
14.	(a)	Explain step by step procedure for seismic analysis of RC buildings as per IS 1893:2002	CO4-U	(16)
		Or		
	(b)	Explain in detail about Effects of Earthquake in different types of structures	CO4-U	(16)
15.	(a)	Explain about the Design Considerations for the Earthquake Resistant Design (ERD) of Masonry structures	CO5-U	(16)
		Or		
	(b)	Describe the significance of planning considerations / architectural concepts As per Is:4326 - 1993	CO5-U	(16)