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**Question Paper Code: 99117**

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

Elective

Civil Engineering

19UCE917- STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING

(Regulations 2019)

Duration: Three hours

Maximum: 100 Marks

PART A - (5x 1 = 5 Marks)

Answer All Questions

1. The oscillation of simple pendulum is ..... vibration CO1- U  
(a) Forced (b) free (c) damped (d) undamped
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. Explain damping ratio 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

## PART – C (5 x 16= 80Marks)

11. (a) A vibrating system consists of a mass of 5kg, spring of stiffness 120 N/m and a damper with a damping co-efficient of 5 N/s/m. determine a. Damping factor b. Natural frequency of the system c. Logarithmic decrement
- Or
- (b) Derive the equation of motion for a Free Undamped SDOF system by D alembert Method. CO1-App (16)
12. (a) Explain about modal superposition method CO2- U (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 in detail about stud wall construction as per Is4326:1993 CO5-U (16)
- Or
- (b) Describe the significance of planning considerations / architectural concepts As per Is:4326 - 1993 CO5-U (16)