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**Question Paper Code : 40820**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Seventh Semester

Civil Engineering

CE 6701 – STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING  
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Use of 1893-2002 is permitted  
Answer ALL questions.

PART – A

(10×2=20 Marks)

1. Define degrees of freedom.
2. State D'Alemberts principle.
3. What is fundamental frequency and fundamental mode shape ?
4. List out the assumptions made in the concept of shear building.
5. Differentiate between 'P-waves' and 'S-waves'.
6. Define Magnitude and Intensity of an earthquake.
7. What are the irregularities found on RC buildings during earthquake ?
8. What is base shear ?
9. Write down the design philosophies in the earthquake resistant structural design.
10. State the importance of ductility in RC structures.

11. a) A damped free vibration test is conducted to determine the dynamic properties of a one storey building. The mass of the building is 10,000 kg. Initial displacement of the building is 0.702 cm. Maximum displacement on the first cycle is 0.53 cm and period of this displacement cycle is 1.7s. Determine the effective weight, undamped frequency, logarithmic decrement, damping ratio, damping coefficient, damped frequency and the amplitude after 6 cycles.

(OR)

- b) Derive the equation of motion for viscous damping.

12. a) State and prove Orthogonality and Normality principle of mode shapes.

(OR)

- b) Determine the natural frequency and draw the mode shape for the shear building shown in figure 1.

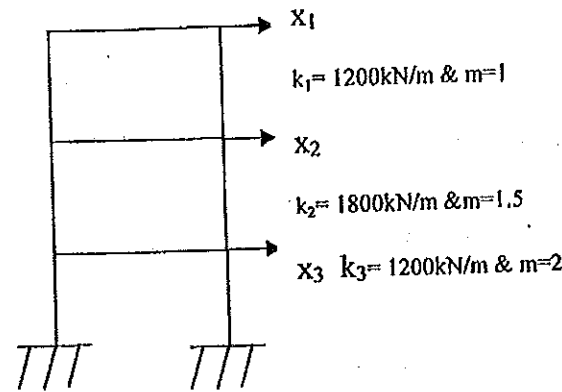


Figure 1

13. a) Explain in detail about plate tectonic theory. List some of the past earthquakes caused by plate tectonics.

(OR)

- b) Describe about the characteristics of strong ground motion with a neat graph.

14. a) Explain the behavior of Prestressed concrete structures under earthquake loading.

(OR)

- b) Determine the design lateral forces at each floor level for a two storey RC shear frame of a hospital building for the following data. Use response spectrum method of IS 1893-2002.

Seismic weight of each floor = 50 kN

Spacing between columns = 3 m C/C

Height of each floor = 3 m

Type of structure = Special moment resisting frame

Location of the building = Coimbatore

Type of soil = Rock

Combined stiffness of ground floor columns : 2000 kN/m

Combined stiffness of first floor columns : 1000 kN/m

15. a) Discuss the causes of damages occurred in RC building.

(OR)

- b) Explain how confining reinforcement is done in columns as per IS 13920-1993.