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

Question Paper Code : 20282

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh Semester

Civil Engineering

CE 6701 — STRUCTURAL DYNAMICS AND EARTH QUAKE ENGINEERING

(Regulations 2013)

(Common to PTCE 6701 — Structural Dynamics and Earth Quake Engineering for B.E (Part-Time) – Fifth Semester – Civil Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Explain De Alembert's principle

2. Brief about the SDOF system and free body diagram.

3. What is meant by mode super position technique?

4. Enumerate properties of stiffness matrix and mass matrix.

5. Classify the faults based on the direction of the movement of blocks.

6. What is meant by reservoir induced Earthquakes?

7. Brief short column damage in RC buildings.

8. Brief P- delta effects.

9. Define structural plan density.

10. Differentiate Weak storey and soft storey.

PART B — (5 × 13 = 65 marks)

11. (a) A machine of mass one tonne is acted upon by an external force of 2450 N at a frequency of 1500 rpm. To reduce the effects of vibration, isolator of rubber having a static deflection of 2 mm under the machine load and an estimated damping (=0.2) are used.

Determine

(i) the force transmitted to the foundation (6)

(ii) the amplitude of vibration of Machine. (7)

Or

(b) A SDOF system having a mass of 2.5 kg is set into motion with viscous damping and allowed to oscillate freely. The frequency of oscillation is found to be 20 Hz and the measurement of amplitude of vibration shows two successive amplitudes to be 6 mm and 5.5 mm. Determine the viscous damping coefficient. (13)

12. (a) Determine the natural frequencies of vibration of MDOF system by using matrix method as shown in figure 12 (a). (13)

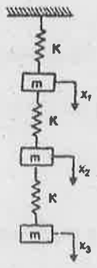

Fig 12 (a)

Or

(b) Determine the natural frequencies of the system as shown in figure 12 (b) by Holzer method. (13)

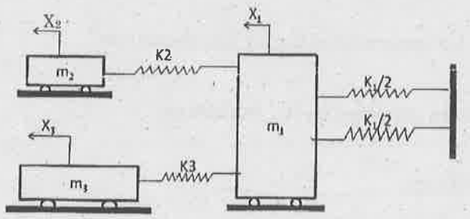

Fig (12) (b)

13. (a) (i) Explain elastic rebound theory. (5)

(ii) Explain the seismic susceptibility of Indian Subcontinent. (8)

Or

(b) Discuss ground subsidence, slope instability due to Earthquake and methods of evaluating liquefaction potential. (13)

14. (a) Elaborate the Planning and Architectural consideration in RC buildings and discuss the potential deficiencies of buildings exist in our society. (13)

Or

(b) Discuss the dynamic Analysis procedure of RC framed Structure as per IS 1893 :2002 with suitable assumed data of your choice. (13)

15. (a) Elaborate the seismic detailing requirements of a shear wall and elements of RC framed Structures as per IS: 13920-1993. (13)

Or

(b) Discuss the evaluation of stresses involved in masonry pier with a masonry building of your choice. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Determine the natural frequencies of vibration and the ratio of the amplitudes of motion of mass m_1 and m_2 for the system shown in figure 16 (a) Here the stiffness is K1 between the support and mass 1. (15)

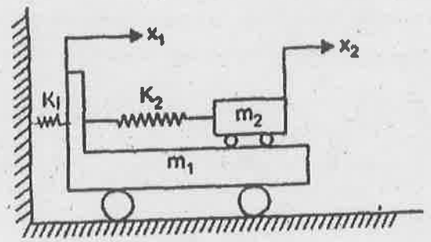

Fig 16 (a)

Or

(b) A damped free vibration test is conducted to determine the dynamic properties of a one storey building. The mass of the building is 10 tonne. Initial displacement of the building is 7.02 mm. Max displacement on the first cycle is 5.3 mm and the period of this displacement cycle is 1.7s. Determine the effective weight, undamped frequency, logarithmic decrement, dampngratio, damped frequency and the amplitude after 6 cycles. (15)

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