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

Question Paper Code : 60265

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

Civil Engineering

CE 2403/CE 73/10111 CE 703 — BASICS OF DYNAMICS AND ASEISMIC DESIGN

(Regulations 2008/2010)

(Common to PTCE 2403/10111 CE 703 — Basics of Dynamics and Aseismic Design for B.E. (Part-Time) Fifth/Seventh Semester – Civil Engineering – Regulations 2009/2010)

Time : Three hours Maximum : 100 marks

Use of IS 1893 – 2002/IS 13920 –1993 (Reaffirmed 1999) and IS 4326 – 1993 is permitted)

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between free and forced vibration.

2. What are the various types of dynamic loads?

3. What is meant by coupled and uncoupled equations of motion?

4. What is meant by mode shape?

5. What is Elastic rebound theory?

6. Briefly explain Modified Mercalli Intensity.

7. What is liquefaction of soils?

8. What is ductility ratio?

9. Define base isolation techniques.

10. Write any two important points in mitigating effects.

PART B — (5 × 16 = 80 marks)

11. (a) Show that the log-decrement is also given by the equation, $\delta = 1/n \log(U_0/U_n)$ where U_n'' represents the amplitude after n'' cycles have elapsed.

Or

(b) A machine foundation weighs 60 kN. The spring constant is 11000 kN/m and dash pot (damper) constant C 200 kN s/m. Determine,

(i) whether the system is over damped, undamped or critically damped

(ii) logarithmic decrement

(iii) ratio of two successive amplitudes

(iv) damped natural frequency

(v) if the initial displacement is 10 mm and initial velocity is zero displacement at t = 0.1 S.

12. (a) Explain with neat examples of Multi-Degree-of-Freedom systems.

Or

(b) Derive the orthogonality relation between the modal shapes of a two degrees of freedom.

13. (a) Explain briefly plate tectonics and lithospheric plates. (16)

Or

(b) Discuss on some of the disastrous earthquakes. (16)

14. (a) (i) What are the concepts of peak ground acceleration? (10)

(ii) Explain the response spectrum IS 1893:2002 with neat sketch. (6)

Or

(b) (i) Write short notes on the two main categories of liquefaction of soil. (6)

(ii) Briefly describe any five methods to reduce liquefaction of soil. (10).

15. (a) (i) Explain the principles of general principles of IS 1893 (Part 1): 2002. (8)

(ii) Explain the plan irregularities of irregular buildings. (8)

Or

(b) A three storeyed symmetrical RC school building situated at Bhuj with the following data (16)

Plan dimensions	:	7 m
Storey height	:	3.5 m
Total weight of beams in a storey	:	140 kN
Total weight of slab in a storey	:	260 kN
Total weight of column in a storey	:	60 kN
Total weight of walls in a storey	:	540 kN
Live load	:	140 kN
Weight of terrace floor	:	675 kN

The structure is resting on hand rock. Determine the total base shear and lateral loads at each floor levels for 5% of damping using seismic co-efficient method.
