Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐

K 6426

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Elective

Structural Engineering

ST 1622 — ASEISMIC DESIGN OF STRUCTURES

(Regulation 2005)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

Use of Codes IS 456, IS 1893 and IS 13920 is permitted.

PART A — (10 × 2 = 20 marks)

1. What is meant by elastic rebound theory?

2. Differentiate between Design Basis Earthquake and Maximum Considered Earthquake.

3. Define 'Isoseimal map'.

4. What are the lateral load resisting systems?

5. What are the different functions of shear wall?

6. Calculate the fundamental natural period T for a shear wall of height 15 m.

7. Explain the term 'Re-entrant corners'.

8. Define 'Response spectrum'.

9. What is meant by plan irregularities?

10. Write the limitations in Base Isolation Systems.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Briefly explain the different types of Faults with neat sketches.

    (ii) Write about seismic zoning map of India.

    Or

    (b) (i) Discuss about the different types of building failures observed during past earthquakes.

    (ii) List out any four major Indian Earthquakes.

12. (a) A three storeyed building is in seismic zone IV. Its foundation is on isolated footing on medium soil and the period of oscillation T = 0.2 seconds. Calculate the horizontal seismic coefficient by static and dynamic method assuming damping factor of 5% and SMRF and OMRF frames.

    Or

    (b) Write step by step procedure for the design of reinforced concrete shear wall.

13. (a) A Beam AB of span 6 m is to be designed for moments M_A = –69 kNm and +25 kNm, M_B = –88 kNm and +5 kNm. The characteristic live and dead loads are 10 kN/m and 5 kN/m respectively. The size of beam is 300 mm × 500 mm with 150 mm slab. The structure is situated in zone IV. Design the beam as per IS 13920. Use M 25 grade of concrete and Fe 415 steel.

    Or

    (b) A block of ten storeyed flats in Chennai has its lower most column 500 mm × 700 mm in size. In order to use the ground floor for car parking, the lower columns are free standing. Design the column as per IS 13920. Use M 25 grade of concrete and Fe 415 steel.

14. (a) Briefly discuss the following :

    (i) Behaviour of Masonry buildings in past earthquakes.

    (ii) Strengthening techniques of Masonry buildings.

    Or

    (b) Explain the earthquake resistant features of the following :

    (i) Earthen Dams.

    (ii) Concrete Dams.

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Write in detail about the different types of passive control systems with neat sketches.

Or

(b) Write notes on the following :

(i) Concept of Base Ioslation systems.

(ii) Strengthening techniques of existing reinforced concrete buildings.

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