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Question Paper Code : 71784

M.E. DEGREE EXAMINATION, JUNE/JULY 2013.

Second Semester

Structural Engineering

ST 9224/ST 924/UST 9124/10211 SE 204 — EARTHQUAKE ANALYSIS AND DESIGN OF STRUCTURES

(Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between Rayleigh waves and Love waves.
2. What are the main characteristics of seismic waves?
3. What is modal participation factor?
4. Why are the practical structures reduced to discrete system?
5. List the potential deficiencies of Masonry buildings.
6. List any four consequences of the failure of non structural elements.
7. Why do we use coupled shear wall?
8. List the different method of Lateral Load analysis.
9. What is damper in a vibrating system
10. What is capacity based design?

PART B — (5 × 16 = 80 marks)

11. (a) How do the flexibility of buildings affects their earthquake response? (16)

Or

- (b) Elaborate the general principles for reliable seismic performance. (16)

12. (a) Write the Procedure to calculate design lateral loads for the frame using IS 1893-2002 (Part I) procedure. Assume suitable data if required. (16)

Or

- (b) The Plan and Elevation of a three storey RCC School building are as shown in Fig 1. The building is located in seismic zone V. The type of soil encountered is medium stiff and it is proposed to design the building with a special moment resisting frame. The intensity of dead load is 10 kN/m^2 and floors are to cater to an imposed load of 3 kN/m^2 . Determine the design seismic loads on the structure by the static analysis. Take $Z = 0.36$, $I = 1.5$, $R = 5$ Take $S_a/g = 2.5$ for the time period between 0.10 to 0.40. (16)

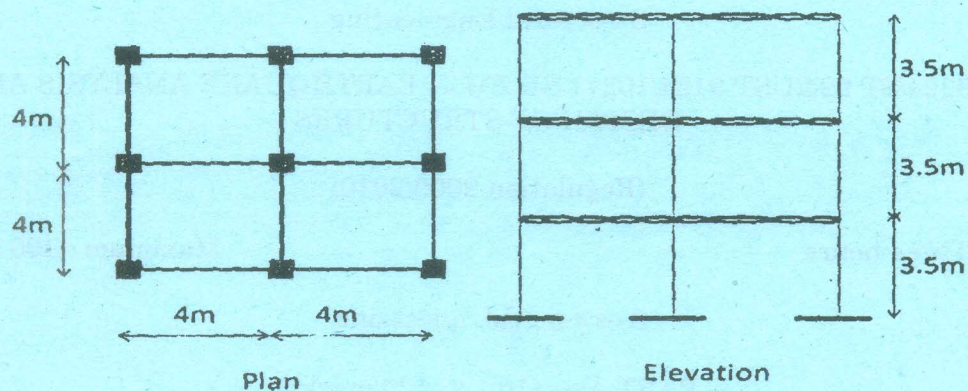


Fig. 1

(Assume suitable data if needed)

13. (a) List some common deficiencies observed in RC and masonry buildings in India. (16)

Or

- (b) Explain how the masonry buildings resist earthquake as per the guidelines for Earthquake resistant design. (16)

14. (a) Discuss the design of column and frame members subjected to bending and axial load. (16)

Or

- (b) Discuss the seismic detailing requirements of a shear wall and coupled shear wall as per IS: 13920-1993. (16)

15. (a) Discuss the mathematical modeling of multistoried RC buildings. (16)

Or

- (b) Discuss the nonlinear push over analysis with the role of performance point. (16)