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

Question Paper Code: 12064

M.E. DEGREE EXAMINATION, DECEMBER 2013.

First Semester

Structural Engineering

01PSE103 - EARTHQUAKE RESISTANT DESIGN OF STRUCTURES

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Use of IS 13920, IS 1893(Part I) and IS 4326 are permitted.

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Define elastic rebound theory.
2. List out the seismic zoning of India.
3. What is response spectrum?
4. Define degree of freedom.
5. List out the causes of damages due to earth quake.
6. Define storey drift.
7. List the methods for lateral load analysis.
8. What is coupled shear wall?
9. List out the various measures of vibration control.
10. Define base isolation techniques.

PART - B (5 x 14 = 70 Marks)

11. (a) Discuss the characteristics of different types of seismic waves. (14)

Or

(b) Discuss the measurement of earthquakes. Explain the working of seismograph. (14)

12. (a) The free vibration properties of a 3 storeyed OMRF school building located in zone 5 are:

Weight (kN)	Natural Period (sec)	0.0647	0.023	0.016
	Mode	1	2	3
640	3rd floor	1.00	1.00	1.00
688	2nd floor	0.802	-0.555	-2.247
688	1st floor	0.4450	-1.2460	1.8018

Determine the design seismic forces by dynamic analysis and show the distribution of lateral forces with building height. (14)

Or

(b) Discuss the methods for determination of seismic forces in building frames. (14)

13. (a) Discuss the guidelines for earthquake resistant design of masonry structures. (14)

Or

(b) Explain how the seismic behaviour of a masonry structure can be improved. (14)

14. (a) A RCC beam of rectangular section has to carry a live load of 25 kN/m and a dead load of 30 kN/m. The maximum bending moment and shear force due to earthquake are 60 kNm and 40 kN respectively. Span of the beam is 6 m. Design the beam .Adopt M_{25} and Fe $_{415.}$ (14)

Or

(b) Design the reinforcement for a column of size 450 x 450 mm , subjected to the following forces. The column has an unsupported length of 3 m. Use M_{25} and Fe $_{415}$.

	Dead Load	Live load	Earthquake load
Axial load (kN)	1000	800	550
Moment (kNm)	50	40	100

(14)

15. (a) Discuss the principle of base isolation technique. Explain one device in detail. (14)

Or

(b) Explain the principle of capacity based design in earthquake resistant design. (14)

Part – C (1 x10 = 10 marks)

16. (a) Explain the significance of ductility in earthquake resistant design. (10)

Or

(b) Discuss the importance of shear wall in earthquake resistant design. (10)

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