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**Question Paper Code : 82311**

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 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

IS 1893–2002 is permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define microzonation.
2. Why do we need more than one earthquake magnitude scale?
3. What are the effects of earthquakes?
4. How do seismologists measure the size of an earthquake?
5. What are the principles of earthquake engineering?
6. How to restrict torsional irregularities in buildings?
7. Define shear walls.
8. Write the expression used for distributing lateral force along the height of the building.
9. Define base isolation.
10. List down the types of dampers used to resist earthquakes.



PART B — (5 × 16 = 80 marks)

11. (a) Explain the working principles and applications of seismograph with a neat sketch.

Or

- (b) Describe the general characteristics of strong earthquake motion. Explain how to estimate earthquake parameters.

12. (a) How will you construct response spectrum diagram. Explain the types of response spectrum with neat sketches.

Or

- (b) Explain the lessons learnt from post earthquakes. Discuss any two case studies.

13. (a) What are the plan irregularities normally occurred in buildings? Discuss any three plan irregularities and suggest methods to rectify those irregularities.

Or

- (b) Explain the types of bands required to be provided for earthquake resistance of masonry structures.

14. (a) List down the types of shear walls that are used for earthquake resistant buildings. Explain reinforcement detailing of coupled shear walls.

Or

- (b) An Industrial multi-storeyed building 25 m high is to be designed in Darbhanga city. Compute the seismic lateral force by using static analysis method as per IS 1893–2002.

Soil type : Rocky soil

Lumped weight on floors :

Dead load : 13 kN/m<sup>2</sup>

Live load : 3.5 kN/m<sup>2</sup>

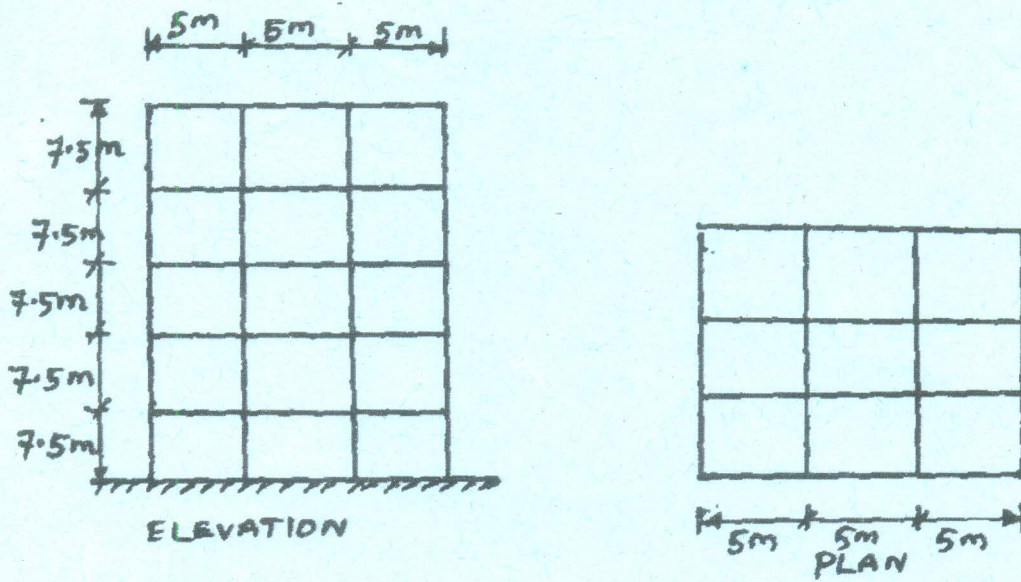
Lumped weight on roof :

Dead load : 10 kN/m<sup>2</sup>

Live load : 1.25 kN/m<sup>2</sup>



Walls : R.C. in filled with brick masonry panel frames used.



15. (a) Explain the concepts and procedures of capacity based design.

Or

- (b) Explain the types of dampers which are used to control vibrations during earthquakes.