

8E8096

Roll No. _____

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8E8096**B.Tech. VIII Semester (Main/Back) Examination, April-May, 2017****Civil Engineering****8CE4.3A Earthquake Resistant Construction and Design****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal marks**. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. IS : 1893 (Part - I) : 2002

Unit-I

1. a) Explain seismic zoning map of India and its significance. Give the important cities/places lying under zone-V. (6)
b) With the help of neat sketch differentiate between p-waves and s-waves describing their characteristics. (10)

(OR)

1. a) Explain the occurrence of Tsunami gives two examples (of each) of recent earthquakes and Tsunami giving their important features. (6)
b) Describe the important seismic hazards and their preventive measures. (10)

Unit-II

2. Describe the following terms : (4×4)
 - a) Seismic isolation
 - b) Types of damping
 - c) Liquefaction phenomenon
 - d) Non structural failures

(OR)

2. a) Describe the principle of seismic instrument. Give typical labelled sketch of the same. (8)
- b) Explain the behaviour of masonry building subjected to earthquakes. (8)

Unit-III

3. Describe the following terms and their significance : (4×4)
- a) Re-entrant corners
- b) Centre of rigidity
- c) Plinth band and Lintel band
- d) Integrity of different components of a building

(OR)

3. Describe the role of architectural and planning consideration in earthquake resistant construction. (16)

Unit-IV

4. a) Describe shore wells, their types and advantages for earthquake resistant construction. (8)
- b) Explain the provisions of ductile detailing at beam-column junction and its advantages. (8)

(OR)

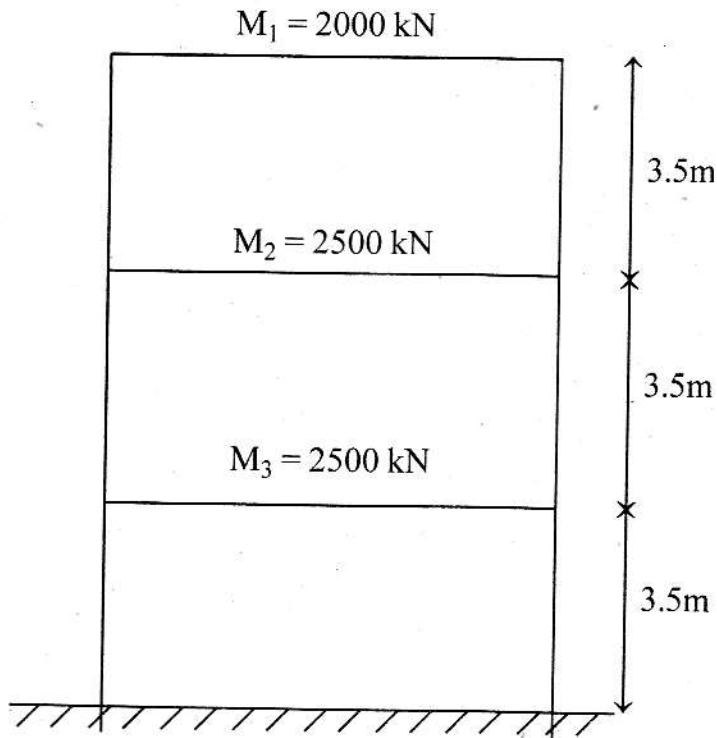
4. Describe the following : (4×4)
- a) Weak beam strong column concept
- b) Soft story and weak story
- c) Adjacency of buildings
- d) Stiffness irregularity in plan and elevation

Unit-V

5. Describe the procedure for calculating the base shear as per IS 1893:2002. Also mention the limitations of the method and importance of response reduction factor. (8+4+4)

(OR)

5. Determine the total base shear and distribute it along the height of the building as per IS: 1893 (part 1) : 2002 for the following building (shown in fig) and the data given below : (16)



- Building situated in Delhi on the medium soil strata
- M_1 , M_2 and M_3 are the dead load and live load lumped at floor levels.
- Building is intended to be used as a school.
- Building is a R.C.C. framed structure type.



8E4031

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8E4031**B.Tech. VIII Semester (Old Back) Examination, April/May-2017****Civil Engineering****8CE1(O) Geotechnical Engineering-II****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) Explain Westergard's theory for determination of the vertical stress at a point. Discuss various approximate methods for determination of the vertical stress at a point. What are their limitations. (8)
- b) A concentrated load of 200t is applied at the ground surface. Compute the vertical pressure : (4+4)
 - i) At a depth of 5m below the load.
 - ii) At a distance of 4m at the same depth. Use Boussinesq's equation.

(OR)

1. a) What do you understand by Isobar? Show the isobar for two load intensities and explain the application of the same. (8)
- b) What are the assumptions of Boussinesq's analysis of stresses due to vertical loads, draw stress distribution diagram due to point load. (4+4)
 - i) A long vertical line and
 - ii) A long Horizontal line

Unit-II

2. a) What are assumptions of Terzaghi's one dimensional theory of consolidation? Discuss its limitations. (8)
- b) A clay soil sample 24mm thick was obtained from the field and tested in the laboratory. The sample reached 50% Consolidation in 25minutes. If the thickness of the layer from which the sample was taken is 4.8m, how much it will take to reach same degrees of consolidation. (4+4)
- i) If the layer has double drainage
- ii) If the layer has single drainage

(OR)

2. a) What is difference between compaction and consolidation? (8)
- b) Define the terms "Compression Index" "Coefficient of Consolidation" and coefficient of compressibility and indicate their units and symbols. (8)

Unit-III

3. a) Describe culmann's method for stability analysis of homogeneous slope. What are its limitations? (8)
- b) Describe frictional circle method of stability of slope. (8)

(OR)

3. What are different types of slope failure? Derive an expression for the factor of safety of infinite slope in a cohesionless soil. (16)

Unit-IV

4. a) Write short notes : (3×2=6)
- i) Earth pressure at rest
- ii) Active earth pressure
- iii) Passive earth pressure
- b) What are the assumptions of Rankine's theory? Derive the expressions for active pressure. (10)

(OR)

4. a) Explain culmann's graphical method for active earth pressure. (8)
- b) A retaining wall has a vertical back and is 8m high, with horizontal backfill. Determine active and passive earth pressure on wall per unit length. Take $C = 100 \text{ kN/m}^2$ (8)

$$\phi = 0$$

$$r = 1 \text{ g kN/m}^3$$

Unit-V

5. a) Describe plate load test. What are its limitation and uses? (10)
- b) Explain the following : (3×2=6)
- i) Ultimate bearing capacity
 - ii) Allowable bearing pressure
 - iii) Gross load intensity

(OR)

5. a) What are the assumptions of Terzaghi's theory of bearing capacity? Discuss its limitations. (8)
- b) Determine net safe bearing capacity of a footing of size 2m × 3m resting at a depth of 1.5m on a soil having $\rightarrow C = 0, \phi = 35^\circ, \gamma = 18\text{kN/m}^3$ Take $N_c = 25, N_q = 13, N_r = 11$. (8)

