

**B.Tech. CIVIL ENGINEERING (BTCLEVI)**

**Term-End Examination**

00004

**June, 2017**

**BICEE-011 : EARTHQUAKE RESISTANT DESIGN  
OF STRUCTURES**

*Time : 3 hours*

*Maximum Marks : 70*

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***Note :** Assume any missing data suitably. Use of IS : 1893 – 2002 is allowed. Attempt any **five** questions. All questions carry equal marks. Use of scientific calculator is permitted.*

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1. Write short notes on any **two** of the following : *2×7=14*
  - (a) Elastic Rebound Theory
  - (b) Seismicity of India
  - (c) Soft Storey
  
2. Derive the expression for an undamped 2-DOF system. *14*
  
3. Discuss the general design principles, design criteria and design requirements of elevated water tank as per Indian codal provisions. *14*

4. (a) Irregularities in mass and stiffness are not desirable in buildings situated in earthquake prone areas. Describe using diagrams how these occur and affect buildings. 7
- (b) Differentiate between flexible and stiff structures with respect to earthquake resistant structures. 7
5. The successive amplitudes from a free vibration test for a structure are 0.69, 0.362, 0.19 and 0.099 units respectively. Determine the damping ratio of the system considering each cycle separately and considering them all together. 14
6. A four-storey reinforced concrete frame building as shown in Figure 2, is situated at Roorkee. The height between the floors is 3 m and the total height of the building is 12 m. The dead load and normal live load is lumped at the respective floor. The soil below the foundation is assumed to be hard rock. Assume the building is intended to be used as a hospital. Determine the total base shear as per IS 1893 (Part 1) : 2002. Distribute base shear along the height of the building. 14

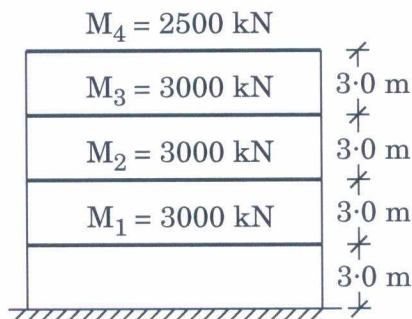


Figure 2