

**881**

**B. Tech. EXAMINATION, 2020**

(Eighth Semester)

(Old Scheme) (Re-appear Only)

(CE)

CE402

**ELEMENTS OF EARTHQUAKE ENGINEERING**

*Time : 3 Hours]*

*[Maximum Marks : 100*

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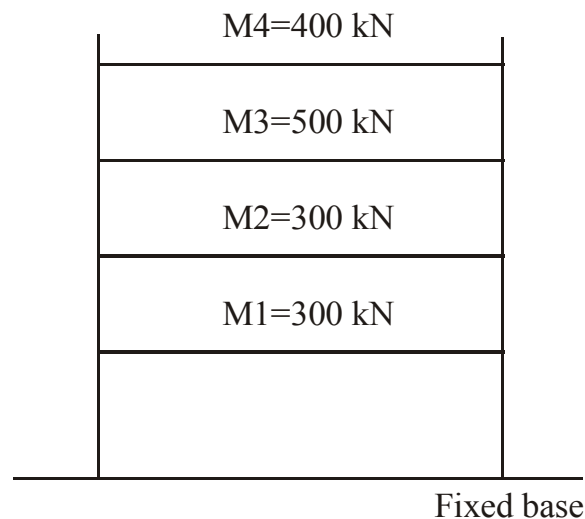
Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

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**Note :** Attempt any *Five* questions. Assume any data if missing in the question paper.  
Use of IS 1893 and IS 13920 is allowed.

1. Formulate an equation of motion for damped harmonic multidegree of freedom system. Explain logarithmic decrement. **20**
2. Explain the nature of dynamic loads like earthquake, wind and blast loads. What is their method of discretization ? **20**
3. Write short notes on the following : **20**
  - (a) Soft storey failure
  - (b) Floating columns
  - (c) Plan and mass irregularity
  - (d) Pounding of columns.

4. A R.C frame consists of beam having spans of 5 m c/c. A typical floor inner beam carries a negative bending moment of 450 kN-m and a shear of 525 kN at the face of beam column joint due to gravity and earthquake loads. Design the beam section for ductility. Use IS 13920. **20**
5. Explain the following : **10+10**
- Seismic resistant building architecture.
  - Various techniques used in repairing and strengthening of the building.
6. Define mode shape, eigenvalues and eigen vectors. What is ductility ? Explain its significance. What are the factors that affect the ductility of beam ? **20**
7. A four-story reinforced concrete frame building is situated at Delhi. The height between the floors is 4 m and total height of building is 16 m. The dead load and normal live load is lumped at respective floors. The soil below the foundation is assumes to be hard rock. Assume building is intended to be used as a hospital. Determine the total base shear as per IS 1893 (Part 1) : 2002. Distribute the base shear along with the height of the building. **20**



8. Write down the recommendations mentioned in the masonry code like IS 4326 and IS 13828. **20**