Code: 20CE6701

**IV B.Tech - I Semester - Regular Examinations - DECEMBER 2023**

# EARTHQUAKE ENGINEERING
## (HONORS in CIVIL ENGINEERING)

Duration: 3 hours                                    Max. Marks: 70

Note:  1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level                              CO – Course Outcome

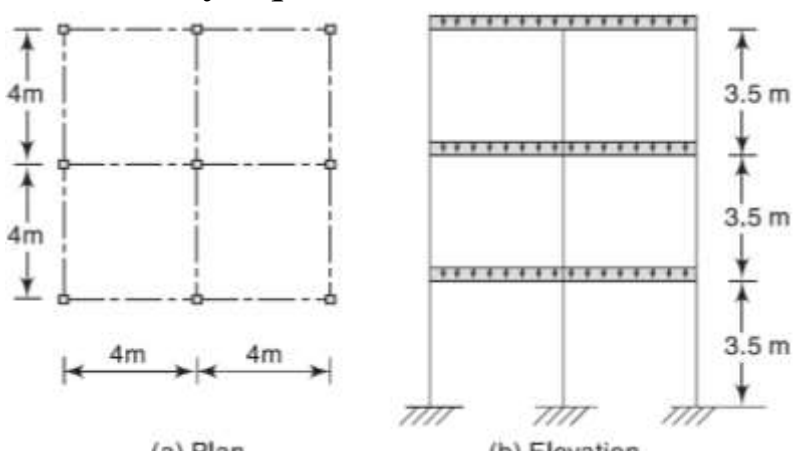|   |   | BL | CO | Max. Marks |
|---|---|----|----|------------|
| **UNIT-I** | | | | |
| 1 | With the help of neat sketches wherever necessary explain about the Elastic Rebound theory and the Plate Tectonic theory. | L2 | CO1 | 14 M |
| **OR** | | | | |
| 2 | Discuss in detail about the direct and indirect effects of earthquake. Also explain the consequences of earthquake damage. | L2 | CO1 | 14 M |
| **UNIT-II** | | | | |
| 3 | With the help of neat sketches differentiate about the various seismic waves in detail. | L2 | CO2 | 14 M |
| **OR** | | | | |
| 4 | How do you measure the earthquake? What are the earthquake measurement parameters? Explain. Differentiate magnitude and intensity of earthquake. | L2 | CO2 | 14 M |

## UNIT-III

| 5 | With the help of neat sketches differentiate the behaviour of unreinforced and reinforced masonry walls. | L2 | CO3 | 14 M |
|---|---|---|---|---|
| | **OR** | | | |
| 6 | How do you improve the performance of masonry buildings during the earthquake? Explain. | L2 | CO3 | 14 M |

## UNIT-IV

| 7 | The plan and elevation of a three-storey RCC school building is shown in Fig. 1 below. The building is located in seismic zone V. The type of soil encountered is medium stiff and it is proposed to design the building with a special moment-resisting frame. The intensity of DL is 10 kN/m$^2$ and the floors are to cater to an IL of 3 kN/m$^2$. Determine the design seismic loads on the structure by equivalent lateral force method. <br><br>  <br> **Fig. 1:** Building configuration | L3 | CO4 | 14 M |
| | **OR** | | | |

| 8 | A fixed-ended RC beam of rectangular section has to carry a distributed live load of 20 kN/m in addition to its own weight and a dead load of 25 kN/m. The maximum bending moment and shear force due to the earthquake are 60kN-m and 40kN respectively. Centre-to-centre distance between supports is 6m. Design the beam using M-20 grade concrete and Fe-415 steel. Assume the necessary data if required. | L6 | CO4 | 14 M |
|---|---|---|---|---|
| | **UNIT-V** | | | |
| 9 | What is base isolation? Explain the different techniques of seismic base isolation. | L2 | CO5 | 14 M |
| | **OR** | | | |
| 10 | What are the tuned mass dampers? Explain the applications of tuned mass dampers. | L3 | CO5 | 14 M |