



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Eighth Semester, B.E. - Civil Engineering

Semester End Examination; May / June - 2019

Earthquake Resistant Design of Structures

Time: 3 hrs

Max. Marks: 100

Note: i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.

ii) Use of IS 1893-2002 is permitted. iii) Draw sketches wherever possible.

UNIT - I

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|------|---|----|
| 1 a. | Explain the difference between magnitude and intensity. How do you account magnitude and intensity in seismic design? | 10 |
| | b. Describe the different types of earthquake causing fault and explain elastic rebound theory. | 10 |
| 2 a. | Explain with sketches the different types of waves generated during earthquake and mention their characteristics. | 12 |
| | b. Explain seismic zoning map of India and its significance in seismic design. | 8 |

UNIT - II

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|------|--|----|
| 3 a. | What is a response spectrum chart? How are design response spectrum chart developed? | 10 |
| | b. Explain various vertical irregularities with respect to earthquake resistance construction. | 10 |
| 4 a. | Explain various building characteristics which affect the earthquake resistant design. | 10 |
| | b. Explain the philosophy of earthquake resistant design. | 10 |

UNIT - III

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| 5 a. | What are infilled frames and how infilled frames are analyzed? | 10 |
| | b. Explain the guidelines to be followed in earthquake resistant design of structures. | 10 |
| 6 a. | Mention the failure mechanisms of infilled frames during earthquakes. | 8 |
| | b. A four storied special moment resistant R.C. frame building without infill walls to be constructed in Bhuj for a hospital. The height of each floor is 3.0 m and span of the frame is 6 m. The dead and imposed loads are lumped and the total lumped load at each floor is 300 kN and at the roof level is 250 kN. Assume the soil to be on hard rock. Obtain the total base shear and plot the distribution of base shear along the height of the building. | 12 |

UNIT - IV

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| 7 a. | What is liquefaction of ground? Explain the mechanism of liquefaction. | 10 |
| | b. Mention the difference between equivalent static analysis and dynamic analysis. | 10 |
| 8 a. | What is ductility? How it is measured? Discuss the factors influencing ductility. | 10 |
| | b. Explain the codal provisions made in the ductile detailing of flexural members designed for earthquake resistant design. | 10 |

UNIT - V

- 9 a. Explain the different measures to strengthen masonry buildings against earthquake with neat sketches. 10
- b. Mention different strategies adopted for seismic retrofitting of R.C. buildings. 10
- 10. Explain the following with respect to earthquake resistant design construction :
 - a) Behavior of short columns
 - b) Behavior of soft storey frames 20
 - c) Active and Isolation process
 - d) Passive Isolation process

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