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Question Paper Code: BST210



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2018

Regulation: IARE-R16

EARTHQUAKE RESISTANT DESIGN OF BUILDINGS

Time: 3 Hours

(SE)

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

Note: Use of IS 1893:2002 (Part II), IS 13920 is Permitted

UNIT – I

1. (a) Explain the principal strong motion characteristics. [7M]
(b) Explain the formation of earth and its interior. [7M]
2. (a) Obtain the expression for natural frequency of single degree damped free vibration system. [7M]
(b) What is a response spectrum? Discuss its role in earthquake resistant design of structures. [7M]

UNIT – II

3. (a) What are the different vertical irregularities in a building structure? [7M]
(b) Give the procedure for identification of seismic damages in RCC buildings. [7M]
4. (a) Mention the criteria's for earthquake resistance design of buildings. [7M]
(b) In what way is the earthquake resistance of the structure affected by non-symmetry and elongated shape of buildings? [7M]

UNIT – III

5. (a) A 10-storeyed RCC special moment resisting frame (SMRF) conforming to ductile detailing provisions residential building with importance factor 1 is located in zone V. The height of each storey is 3m. The area of each floor is $576m^2$ with a dead load as $2kN/m^2$. The live load on roof is $1.5kN/m^2$. The structure is on medium soil. The damping in the structure is estimated to be 8.5%. Determine the design seismic forces on the structure by equivalent static force method. [7M]
(b) Enumerate failure mechanisms of infilled frames through sketches. [7M]
6. (a) Compare response spectrum method and seismic coefficient method. What for these methods are used? Which one is preferred out of the two? [7M]
(b) Explain briefly the effect of regular and irregular configurations of buildings due to earthquake. [7M]

UNIT – IV

7. (a) Give details about the procedure for design of shear walls as per IS 13920:1993. [7M]
(b) What is ductility? Discuss the factors affecting the ductility of RCC structures. [7M]
8. (a) Design a rectangular beam for 6m span to support a dead load of 15kN/m and a live load of 20kN/m inclusive of its own weight. Moment due to earthquake load is 120kN-m and shear force is 80kN. Use M20 grade concrete and Fe 415 steel. [7M]
(b) Explain the provision briefly for torsion in all buildings based on IS code method. [7M]

UNIT – V

9. (a) Mention the elastic properties of structural masonry. [7M]
(b) Discuss the effect of openings on the seismic performance of masonry buildings. [7M]
10. (a) Define Bands? At what levels in masonry buildings would you provide them? Give justification for each of them [7M]
(b) How would you identify the damages and non damages in masonry structures? [7M]

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