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Question Paper Code: BST210



INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

M.Tech II Semester End Examinations (Supplementary) - January, 2018

Regulation: IARE-R16

EARTHQUAKE RESISTANT DESIGN OF BUILDINGS
(Structural Engineering)

Time: 3 Hours

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 1320 is Permitted

UNIT – I

1. (a) What is strong ground motion? State and discuss their characteristics. [7M]
(b) How is the local magnitude of an earthquake related to the intensity of earthquake? [7M]
2. (a) Determine the natural circular frequency and natural period of vibration of a system of weight 5×10^5 N. The lateral stiffness of the system is 3×10^5 N/m. What is the mass of the system? [7M]
(b) What are the various types of dynamic loads? State some of the characteristics of dynamic loads. [7M]

UNIT – II

3. (a) Simplicity and symmetry are the key to making a building earthquake resistant. Explain the concept with the help of neat sketches. [7M]
(b) Explain in detail identification of seismic damage in RCC buildings. [7M]
4. (a) Irregularities of mass, stiffness and strength are not desirable in buildings situated in earthquake prone areas. Describe using diagrams how these occur and affect the building. [7M]
(b) Write down the basic elements of earthquake resistant design [7M]

UNIT – III

5. (a) State the assumptions made in analysis of earthquake resistant design of buildings [7M]
(b) Briefly explain the procedure of response spectrum method of analysis [7M]
6. (a) Discuss the factors required for assessing [7M]
i) The lateral design forces ii) The design response spectrum
(b) Briefly explain the procedure to calculate the seismic weight of buildings [7M]

UNIT – IV

7. (a) What are the principles of earthquake resistant design of RC buildings. [7M]
(b) Define shear walls and how are the shear walls are classified. [7M]
8. (a) Design a rectangular RCC beam of 7.5m span supported on RCC columns to carry a central point load of 125kN in addition to its self weight. The moment due to seismic force is 40kN-m and shear force is 50kN. Use M20 grade concrete and Fe 415 Steel. Sketch the reinforcement details. [7M]
(b) Define shear walls and how are the shear walls are classified. [7M]

UNIT – V

9. (a) Explain the design procedure of two storey masonry buildings with examples. [7M]
(b) Define bands? At what levels in a masonry building would you provide them? Give justifications for each of them? [7M]
10. (a) Determine the lateral forces on a two-storey unreinforced masonry building situated near Allahabad (Zone-II) for the following data. Plan size = 18mx18m, Total height of the building = 6.2m, Storey height = 3.10m, Weight of roof = $2.5\text{kN}/m^2$, Weight of wall = $5\text{kN}/m^2$, Live load on roof = 0, Live load on floor = $3\text{kN}/m^2$, Zone factor = 1, Response reduction factor = 1, Soil: (Type-II) Medium soil. [7M]
(b) Briefly explain about the damages and non damages of masonry structures. [7M]

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