Hall Ticket No | | | | | | | | | | | Question Paper Code: BST210

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech II Semester End Examinations (Regular) - July, 2017

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 1390 is Permitted

UNIT – I

1. (a) Explain the dynamics of MDOF systems. **[7M]**
   (b) How is the magnitude of an earthquake defined? Is it a true measure of damage potential? Why? **[7M]**

2. (a) What is intensity of an Earthquake? How is it indicated? **[7M]**
   (b) What is seismic hazard analysis? How it is useful? **[7M]**

UNIT – II

3. (a) Explain the principles and design philosophies involved in design of earthquake resistant design of structures? **[7M]**
   (b) Simplicity and symmetry are the key to making a building earthquake resistant. Explain the concept with the help of examples. **[7M]**

4. 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. **[14M]**

UNIT – III

5. The Plan and elevation of a three storey RCC school building is shown in Figure 1. 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 static analysis. **[14M]**

6. Explain the factors involved in seismic coefficient method of analysis in detail. **[14M]**

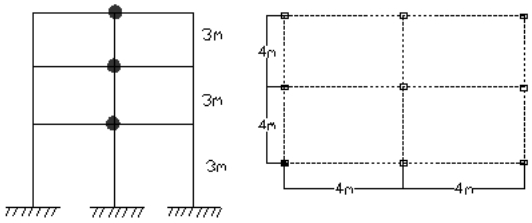

Figure 1

UNIT – IV

7. Define Shear walls? How they are classified. Discuss the various factors which influence the structural performance of shear walls. **[14M]**

8. Design a Rectangular beam for 8 m span to support a dead load of 14 kN/m and a live load of 22 kN/m inclusive of its own weight. Moment due to Earthquake load is 110 kN-m and Shear force is 70 kN. Use M20 grade concrete and Fe 415 steel. **[14M]**

UNIT – V

9. (a) Give the seismic design procedure of a two storey masonry building with example? **[7M]**
   (b) Sketch and explain the different types of bands used in masonry buildings. **[7M]**

10. Determine the lateral forces on a two storey unreinforced brick masonry building as shown in Figure 2 situated in Allahabad (zone III) for the following data : Weight of Roof = 2.5 kN/m^2, weight of wall = 5.0 kN/m^2, Live load on roof = 0 and Live load on floor is 1.0 kN/m^2. I = 1.0 and R = 1.5. Type of soil is medium soil. **[14M]**

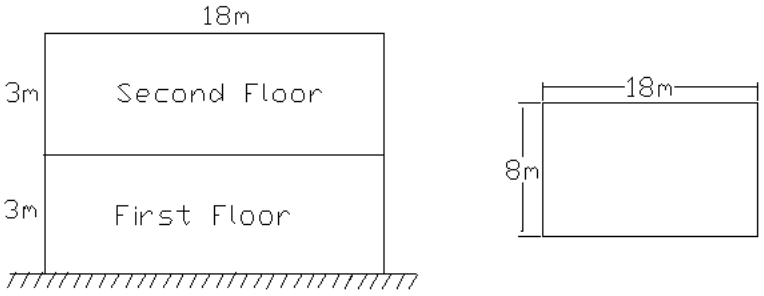

Figure 2

– ○ ○ ◯ ○ ○ –