

Max. Marks: 100

**Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.
2. Use of IS 1983-2002 and IS 13920 is permitted.**

- 1** a. Explain the various geo-spheres that constitute the earth. (04 Marks)
b. Describe the direct and indirect effect of earthquake. (10 Marks)
c. Explain about modified Mercalli intensity scale. (06 Marks)
- 2** a. Describe the characteristics of earthquake ground motion. (10 Marks)
b. Explain the different frequency regions considered in a design spectrum. (06 Marks)
c. Briefly explain the types of earthquake. (04 Marks)
- 3** a. Describe the different types of structural models. (08 Marks)
b. Explain the methods of seismic evaluation. (07 Marks)
c. Briefly explain the methods of seismic testing. (05 Marks)
- 4** a. How do functional requirements affect the building structure from the point of view of earthquake resistance? (10 Marks)
b. Describe, using diagrams, how the irregularities of mass stiffness and strength are not desirable in building situated at earthquake prone areas. (10 Marks)

- 5

 - a. Explain the classification of seismic methods of analysis. (10 Marks)
 - b. Compare the equivalent lateral force method with response spectrum analysis. (10 Marks)
- 6

 - a. Write the step-by-step procedure for seismic analysis of R.C. building by response spectrum method. (07 Marks)
 - b. A three storeyed symmetrical RC school building is situated at Bhuj with the following data:
Plan dimensions : 7 m Storey height : 3.5 m
Total weight of beams in a storey : 130 kN Total weight of slab in a storey : 250 kN
Total weight of column in a storey : 50 kN Total weight of walls in a storey : 530 kN
Live load : 130 kN Weight of terrace floor : 655 kN
The structure is resting on hard rock. Determine the total base shear and lateral loads at each floor levels for 5% of damping, using the equivalent static lateral force method. (13 Marks)
- 7

A RCC 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 60 kN-m and 40 kN respectively. Centre to centre distance between supports is 6 m. Design the beam using M₂₀ grade concrete and Fe415 steel. (20 Marks)
- 8

 - a. Explain the behaviour of unreinforced masonry walls against earthquake shaking. (08 Marks)
 - b. Describe the procedure followed for the seismic design of a masonry building. (12 Marks)

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Important Note :

1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, $42+8=50$, will be treated as malpractice.

