No. of Printed Pages : **3 + Drawing Sheet**

BARE-073

BACHELOR OF ARCHITECTURE (BARCH)

00020

Term-End Examination

June, 2013

BARE-073 : EARTHQUAKE RESISTANT STRUCTURES

(ELECTIVE 1)

Time : 3 hours *Maximum Marks : 70*

*Note : Question **No.1** is **compulsory**. Attempt any four questions from the remaining questions.*

1. Write **true** or **false** for the following statements. **14x1=14**

   (a) The outermost layer of the earth is called mantle.

   (b) The size of an earthquake depends on the amount of energy released.

   (c) Subduction zone boundaries can produce large earthquakes.

   (d) Earthquake intensity is a qualitative measure of the effects of an earthquake at a particular location.

   (e) The point below the ground surface where rupture begins and first seismic wave originates is called epicentre.

   (f) P-waves are transverse waves.

   (g) As per BIS code IS:1893 (Part-1)-2002, India has been divided into five seismic zones.

   (h) Liquifaction occurs only in unsaturated clays.

(i) A Tsunamis is caused by an earthquake.

(j) A one storey structure may be considered as a single-degree-of-freedom system.

(k) For a two-storey frame, the mass matrix is written as $\begin{bmatrix} m_1 & m_2 \\ m_2 & m_1 \end{bmatrix}$.

(l) A shear wall is a plain-concrete wall.

(m) Base isolators introduce rigidity in the structure.

(n) Passive control devices do not require electricity for their functioning.

2. Discuss possible effects of the following hazards associated with earthquakes. **4x3½=14**

(a) Ground shaking

(b) Falling Hazards

(c) Liquifaction

(d) Landslides

3. Draw a neat sketch of the internal structure of the earth. Describe the nature and characteristics of each layer. **14**

4. (a) Describe the procedure for locating epicentre of an earthquake. **7**

(b) What do you understand by earthquake magnitude ? Discuss the relationship between earth quake magnitude and the energy released in an earthquake. **7**

5. Write the differential equation of motion for free vibrations of a viscously damped SDOF system. Discuss its solution for three different cases based on the magnitude of the damping factor. **14**

6. How shall you formulate the equations of motion for the two-storey frame shown in figure - 1 ? Axial deformation in the beams and the columns may be neglected. **14**

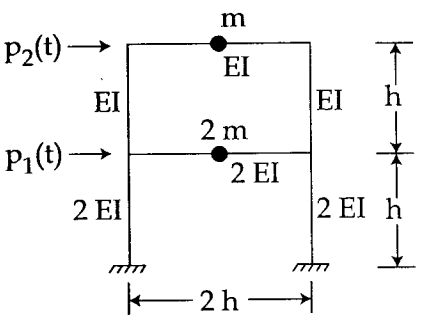

Figure - 1

7. Write short notes on *any four* of the following topics. **4x3½=14**

(a) Shear Wall
(b) Base Isolation
(c) Horizontal Bands in masonry buildings
(d) Indian seismic codes
(e) Factors affecting ductility of structures
(f) Damages in stone masonry buildings due to earthquakes.