Bengal Engineering and Science University, Shibpur

B. Arch. Part – IV, 7th Semester Examination, 2012

DISASTER RESISTANT ARCHITECTURE (AR-701)

Time: 3 Hours **Full Marks: 70**

Neat appropriate sketches will be given due credit.

1. Fill in the following gaps with appropriate word / words: – 1 x 10

   (i) The _____ flows of mantle material of the Earth cause the crust and some portion of the mantle, to slide on the hot molten outer core.

   (ii) The instrument that measures earthquake shaking is called a _____.

   (iii) The energy released by a M_____ earthquake is equivalent to that released by the 1945 Atom Bomb dropped on Hiroshima.

   (iv) When two buildings are too close to each other, they may _____ on each other during strong shaking.

   (v) The engineers do not attempt to make earthquake _____ buildings that will not get damaged even during the rare but strong earthquake.

   (vi) Normally, a _____ failure is preferred over a brittle failure.

   (vii) The time taken by a seismic wave to complete one cycle of motion is called its _____.

   (viii) Guidelines in IS _____ deal with general principles of design and special construction features for improving earthquake resistance of buildings of low-strength masonry.

   (ix) Shear damage occurs in beams when the area of the _____ is insufficient.

   (x) The phenomenon due to which during earthquake shaking, all columns move horizontally by the same amount along with the floor slab, is called rigid floor _____.

2. Write short notes on ***any three*** of the following: – 8 x 3

   (a) Classification of disasters;

   (b) Evolution of Indian seismic zone map;

   (c) Relation between earthquake and natural period of a building;

   (d) General principles for construction of earthquake-resistant buildings.

3. An earthquake ground motion initially comes in contact with the foundation of a building structure and sets it in motion. Illustrate the possible ways and means of reducing the effect of earthquakes on the foundations of buildings. 12

4. (a) What is the fundamental difference between 'gravity loading' and 'earthquake loading'? 1

   (b) Illustrate through sketches how the above difference affects the reinforcement of columns and beams. 6

   (c) What is the strength hierarchy between beams and columns? 5

5. (a) Compare 'out-of-plane' failure with 'in-plane' failure. 4

   (b) What are the different types of in-plane failures? Define each type. 6

   (c) Name the typical four types of horizontal bands employed in masonry buildings with sloped roof. 2