BICEE-011

B.Tech. CIVIL ENGINEERING (BTCLEVI)
Term-End Examination
June, 2016

00446

BICEE-011 : EARTHQUAKE RESISTANT DESIGN OF STRUCTURES

Time : 3 hours   *Maximum Marks : 70*

Note : *Answer **all** questions. All questions carry equal marks. Assume any missing data suitably. Use of IS : 1893-2002 is allowed. Use of scientific calculator is allowed.*

1. Discuss in detail about the following :   *2×7=14*
   (a) Magnitude of an earthquake and Intensity scales
   (b) Seismic waves

2. (a) Discuss in detail about the causes of earthquakes. In how many zones, is our country (India) divided with respect to earthquakes as per IS : 1893-2002 and previous codes.   7

   (b) Give the reasons for the following in RC members subjected to seismic forces :   7
       (i) Depth of beam should not be more than 1/4 of the clear span.
       (ii) Tension steel on any face of beam should not be less than $0 \cdot 24 \dfrac{\sqrt{f_{ck}}}{f_y}$.

3. Discuss in detail about the strength and stiffness considerations in buildings under seismic forces. Also discuss the effect of storey drift in detail with suitable illustrations. *14*

4. Derive the equation of motion for an undamped SDOF system subjected to forced vibration ($F_0 \sin \omega t$). *14*

5. A three-storey building is shown in Figure 1. The height of each floor is 4 m and the total height is 12 m. Calculate the base shear and lateral forces by equivalent lateral force method.
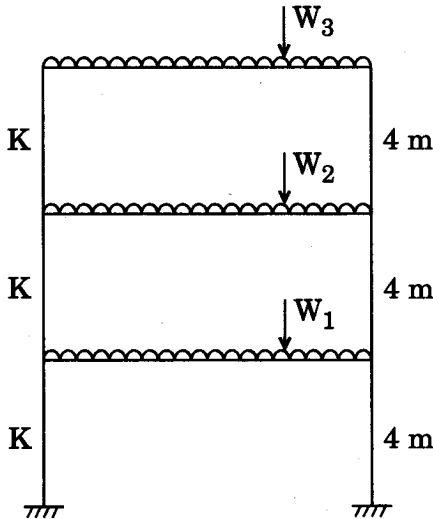

Figure 1

$$W_1 = W_2 = 3900 \text{ kN}$$

$$W_3 = 3000 \text{ kN}$$

Assume the building is in Zone V, residential building, medium soil strata. *14*