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**B.TECH. CIVIL ENGINEERING
(BTCLEVI)****Term-End Examination****December, 2013****BICEE-011 : EARTHQUAKE RESISTANT DESIGN
OF STRUCTURE***Time : 3 hours**Maximum Marks : 70*

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- Note :** (i) *Answer any five questions.*
(ii) *All questions carry equal marks.*
(iii) *Use of calculator is allowed.*
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1. (a) Describe the different types of seismic wave. 7
(b) Explain the different scales for measuring earthquake magnitude. 7
2. Write different methods of ductile detailing for column and frame members subjected to bending and axial load according to IS : 13920-1993. 14
3. Derive the equation of motion for a SDOF system subjected to ground acceleration. 14
4. What are the different types of irregularities in building according to IS : 1893 - 2002 ? What are the effects of earthquake to these irregular structure ? 14

5. (a) Describe the criteria for earthquake resistant design of structure according to IS : 1893(Part-I) 2002. 7
- (b) Describe the criteria for earthquake resistant design and construction of buildings according to IS : 4326-1993. 7
6. Write short notes on **any two** of the followings :
 (a) Response spectrum of earthquake 2x7=14
 (b) Causes of earthquake
 (c) Modal analysis
7. A 3 storey building is shown in fig.1 The height of each floor 3m and total height 9m. Calculate the base shear and moment due to all modes. 14

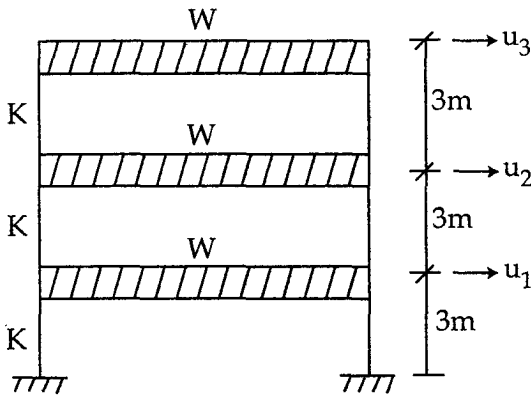


Fig - 1

$$\phi = \begin{bmatrix} 1 & -1 & 1 \\ 0.802 & 0.555 & -2.247 \\ 0.445 & 1.247 & 1.802 \end{bmatrix}$$

$W = 30000 \text{ kg.}$

acceleration (m/sec^2) = {1.76 3.94 4.24}