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10CV834

**Eighth Semester B.E. Degree Examination, June/July 2018**  
**Earthquake Resistant Design of Structures**

Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer any FIVE full questions, selecting at least TWO questions from each part.**  
**2. Use of IS1893-2002 is permitted.**

**PART – A**

- 1 a. What is an earthquake? Explain the earth and its interior. (06 Marks)  
b. Explain the concept of elastic rebound theory with a neat sketch. (06 Marks)  
c. Describe the direct and indirect effects of an earthquake. (08 Marks)
- 2 a. How are earthquakes classified based on different aspects? (06 Marks)  
b. Explain tripartite plot of response spectrum and significance of spectral regions. (08 Marks)  
c. Explain the different ground motion characteristics. (06 Marks)
- 3 a. Explain different code-based methods for seismic design. (06 Marks)  
b. Explain response spectrum method and equivalent static analysis. (08 Marks)  
c. Explain in brief the different seismic retrofitting techniques. (06 Marks)
- 4 a. What are the major aspects involved in seismo resistant building constructions and explain lateral load resisting systems. (08 Marks)  
b. What are the possible structural irregularities which effects on seismic performance of RC buildings. (07 Marks)  
c. What are the special provisions of design of buildings with soft storeys? (05 Marks)

**PART – B**

- 5 a. Explain the philosophy of seismic design. (04 Marks)  
b. Compute the seismic forces for each storeys of a building situated in zone-IV by equivalent lateral force method as per IS1893-2002 with the following details.  
Type of building : Special moment resisting frame residential building foundation on hard soil.  
No. of storeys : 3  
Height of first storey : 4 m  
Height of second storey : 3.2 m  
Height of third storey : 3.2 m  
Seismic weights :  
First storey = 1079.1 kN ; Second storey = 1863.9 kN ; Third storey = 294.3 kN (16 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.

- 6 For the RC building, special moment resisting frame with importance factor = 1 is as shown in Fig.Q6. Founded on soft soil and situated in zone-V. Determine the seismic forces by dynamic analysis procedure for the following free vibration results of the building.

Natural Period (Seconds)	Mode – I	Mode – II	Mode – III
	0.883	0.404	0.302
Roof	1.000	1.000	1.000
Second floor	0.791	0.000	- 0.791
First floor	0.250	- 1.000	0.250

(20 Marks)

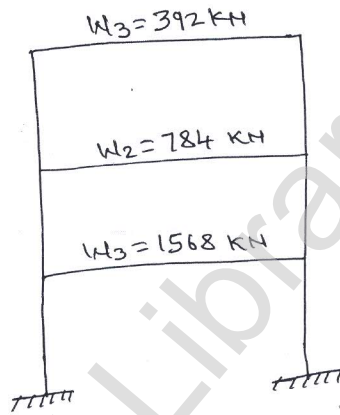


Fig.Q6

- 7 a. What is ductility? Discuss different factors which are helpful in ductility of RC structures. (10 Marks)
- b. What are the different load combinations as per IS1893-2002 to be used for seismic analysis of RCC buildings? (10 Marks)
- 8 a. What is slenderness of masonry wall? What are the measures to improve the slenderness of masonry walls? (10 Marks)
- b. Discuss the behaviour of masonry buildings during earthquakes representing failure patterns. (10 Marks)

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