CBCS SCHEME

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15CV831

Eighth Semester B.E. Degree Examination, June/July 2019
Earthquake Engineering

Time: 3 hrs.

Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing
ONE full question from each module.
2. IS1893-2016 code is permitted.

Module-1

1 a. Explain the concept of plate tectonic theory and with a neat figure explain the concept of elastic rebound theory. **(06 Marks)**
   b. What are the seismic waves? Explain the significant characteristics of seismic waves. **(06 Marks)**
   c. How the classifications of earthquakes are made? **(04 Marks)**

OR

2 a. Explain the difference between magnitude and intensity. What are the isoseismals? **(08 Marks)**
   b. What are the different earthquake ground motion characteristics? **(04 Marks)**
   c. A seismograph located 1200km from the epicenter of an earthquake, records a maximum ground displacement of 15.6mm for surface waves having a period of 20 seconds. Determine the surface wave magnitude. **(04 Marks)**

Module-2

3 a. Derive and plot the response for SDOF system with free vibration undamped case. **(08 Marks)**
   b. Derive and plot the vibration DAF with damping and frequency ratio of an SDOF system subjected to harmonic excitation. **(08 Marks)**

OR

4 a. Explain the dynamic step by step dynamic response procedure for linear acceleration method. **(08 Marks)**
   b. What is response spectrum? And what are the steps involved in construction of design spectrum. **(08 Marks)**

Module-3

5 a. Explain the different vertical irregularities. **(05 Marks)**
   b. What are the lessons learnt with references to seismic behaiour of structural damages during past earthquakes. **(05 Marks)**
   c. Illustrate with the neat sketches the problems associated with the configuration of building and its possible remedial measures. **(06 Marks)**

OR

6 a. Summarize the different philosophy adopted in seismic design. **(06 Marks)**
   b. What are the different types of structural modules to simulate the seismic behaviour of a framed building? **(05 Marks)**
   c. Explain the different code-based methods for seismic design. **(05 Marks)**

Module-4

7. For an RCC-SMRF building frame for office, the seismic weights on the floors are W_1(roof) = 3000 kN, $W_2 = W_3 = W_4$ = 42000kN. The storey heights are ground storey = 4.2m, other storey each of 3.2m. The building is founded on hard soil and situated in zone-IV. Find the seismic force by equivalent lateral force procedure.   **(16 Marks)**

OR

8. For the RCC-SMRF frame building with importance factor = 1. Founded on soft soil and situated in Zone-V. Seismic weights on the floors are W_3(Roof) = 392 kN, W_2 = 784 kN, W_1 = 1568 kN. Determine the seismic forces by dynamic analysis method. The free vibration results for the buildings are.   **(16 Marks)**

Natural Period (sec)	Mode – 1	Mode – 2	Mode – 3
Roof	0.883	0.404	0.302
	1.000	1.000	1.000
2nd FL	0.791	0.000	-0.791
1st FL	0.250	-1.000	0.250

Module-5

9. a. Explain with neat figure of typical failure of RC framed structure.   **(06 Marks)**
   b. Explain with neat sketches of the ductile detailing provisions for columns as per IS-code methods.   **(06 Marks)**
   c. Explain the different methods of retrofitting of structures.   **(04 Marks)**

OR

10. a. Explain the different elastic properties of masonary structures.   **(06 Marks)**
    b. Explain the major steps of the lateral load analysis of masonary building.   **(06 Marks)**
    c. How to make stone masonry buildings earthquake resistant.   **(04 Marks)**

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