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10CV834

Eighth Semester B.E. Degree Examination, Aug./Sept. 2020
Earthquake Resistant Design of Structures

Time: 3 hrs.

Max. Marks: 100

- Note:** 1. Answer FIVE full questions, selecting at least TWO questions from each part.
2. Use of IS-1893-2002 is permitted.

PART – A

- 1 a. Explain the basic on which the seismic zoning is done. (05 Marks)
b. Explain different types of tectonic plate boundaries. (05 Marks)
c. Distinguish between magnitude and intensity of earthquakes. (10 Marks)
- 2 a. Distinguish between Response History and Response Spectrum. Explain with relevant diagrams/graphs. (10 Marks)
b. Explain briefly the parameters affecting the seismic response of structure. (10 Marks)
- 3 a. Distinguish between equivalent static procedure and dynamic analysis procedure of computing seismic forces. (08 Marks)
b. Explain different methods to control the seismic response of structure in detail. (12 Marks)
- 4 a. What are the building characteristics for good seismic resistance? (10 Marks)
b. Explain soft storey concept and IS code provisions for design of buildings with soft storey. (10 Marks)

PART – B

- 5 A four storied RCC special moment resisting frame conforming to ductile detailing provisions, residential building has three equal spans of 4 m C/C in both X-andY- directions. (Area : $12\text{ m} \times 12\text{ m} = 144\text{ sq m}$) Height of each storey is 3.2 m.
Consider the live load as 2.89 kN/sqm, the self weight (dead load) of floor is 11 kN/sqm and self weight of roof is 7.5 kN/sqm. The soil type is hard rock location is zone IV. Neglect the influence of masonry infill stiffness in computation of natural period. Evaluate the base shear and determine the lateral force distribution on each floor. (20 Marks)

6

For a three storied residential building (SMRF) shown in Fig. Q6. Compute the seismic forces using dynamic analysis procedure. The building is in zone V and founded on hard soil.

The free vibration results are:

Natural frequencies : $W_1 = 10.635$ rad/s. $W_2 = 40.347$ rad/s and $W_3 = 54.148$ rad/s.

Modes : $\{\phi\}_1 = \{1.00, 0.97, 0.76\}$

$\{\phi\}_2 = \{1.00, 0.511, -1.811\}$

$\{\phi\}_3 = \{1.00, -0.235, 0.075\}$

(20 Marks)

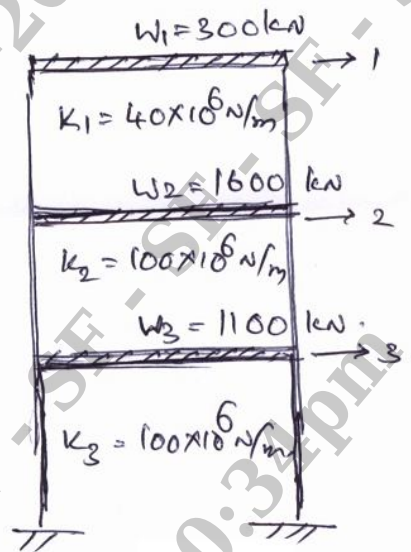


Fig. Q6

- 7 a. Differentiate between the structural behavior under gravity (DL+LL) loads and earthquake loads. (10 Marks)
- b. Explain the ductile detailing of flexural member. (10 Marks)
- 8 a. Write a note on structural properties of masonry and their evaluation. (10 Marks)
- b. Write a note on different techniques of earthquake resistant masonry constructions. (10 Marks)
