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Code No: CE1546

GEC-R14

IV B. Tech I Semester Regular Examinations, November 2017

EARTHQUAKE RESISTANT DESIGN

(Civil Engineering)

Time: 3 Hours

Max. Marks: 60

Note: All Questions from **PART-A** are to be answered at one place.

Answer any **FOUR** questions from **PART-B**. All Questions carry equal Marks.

PART-A

6 × 2 = 12M

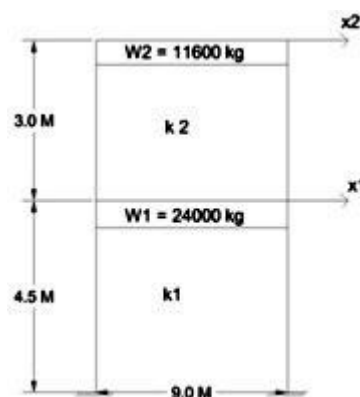
1. Explain strike –slip movement.
2. Explain single degree of freedom system.
3. What is the Orthogonality condition between any two modes?
4. Define storey drift. What are the provisions for these in the Indian standard?
5. What is the maximum spacing in hoops to be provided in flexure in case of ductile structures?
6. What are the factors influencing the structural performance of shear walls?

PART-B

4 × 12 = 48M

1. a) Explain the structure of earthquake. (6M)
b) Explain the phenomenon of earthquake. (6M)
2. A simply supported rectangular beam has a span of 1m with cross-section of 100mm wide and 10mm deep. It is connected at mid span of a beam by means of a linear spring having a stiffness of 100kg/cm and a mass of 300kg is attached at the other end of spring. Determine the natural frequency of the system. Take $E=2.1 \times 10^6 \text{ kg/cm}^2$ (12M)
3. A structure to be analysed for a two storey frame shown in fig. The building consist of a series of frame spaced at 4.5M apart. It is assumed that the structure properties are uniform along the length of the building and therefore analysis to be made up of interior frame shown in the fig, yields the response of entire building. Determine (12M)
i) Natural frequency ii) Mode shapes

Take $E=2 \times 10^6 \text{ kg/cm}^2$, I for lower column= $10.3 \times 10^3 \text{ cm}^4$, I for upper column= $4.91 \times 10^3 \text{ cm}^4$



4. A three storied RCC residential building of 10m x 8m in plan with a storey height 4 m located in seismic zone IV. The type of soil encountered is loose and it is proposed to design the building with SMRF. The intensity of DL is 8kN/m^2 And the floors are to cater to an LL of 3kN/m^2 . Determine the design seismic loads on the structure by seismic coefficient method.

(12M)

5. Describe briefly about ductility considerations as per IS 13920.

(12M)

6. Design a shear wall for a 6 storied building for the following data.

Storey height 3.5m

Length of wall=7m

Seismic weight=30000kN

Axial load on shear wall = 2500kN

Assume M25 and Fe415 steel

Building is situated in Kolkata

(12M)

Storey No	1	2	3	4	5	6
Shear	5	10	30	100	180	340
