

Code: 9A01705

R09

B.Tech IV Year I Semester (R09) Supplementary Examinations, May 2013

EARTHQUAKE RESISTANT DESIGN

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) What is damping?
(b) Explain the dynamic response of spectrum representation for elastic systems.
- 2 Determine the natural frequency and mode shapes for different modes for system shown in figure (1). ($m_1 = m_2 = m$)

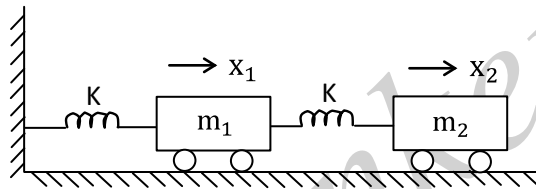


Figure (1).

- 3 In earthquake analysis explain the systems with 'SDOF' and formulate the equation of motion for 'SDOF'.
- 4 (a) According to IS 1893-2002 (part 1), explain the provisions of torsion against the earthquake resistant of buildings.
(b) According to IS 1893-2002 (part 1), explain the design of lateral force and distribution of design force.
- 5 (a) Explain the causes and effects of earthquake.
(b) Explain plate tectonic theory and its mechanism.
- 6 Design reinforcement for column of size 450 X 450 mm, subjected to following forces. Column has unsupported length of 3.5 m and is braced against side sway in both directions. Use m-25 grade concrete and Fe415 steel.

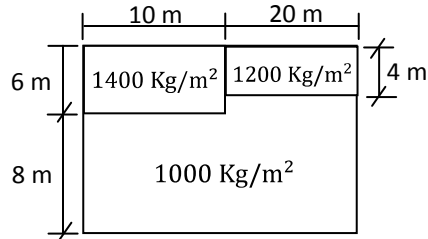
	D.L	L.L	Sesmic load
Axial load (kN)	950	700	550
Moment (kN-m)	50	45	100

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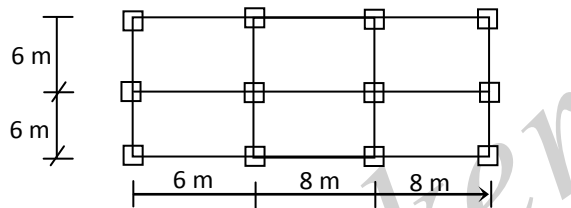
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- 7 (a) For building shown in fig. locate centre of mass. The building has non uniform distribution of mass as shown in fig.



- (b) A plan of a simple one-storey building is shown in fig. All columns and beams have same C/S. Find its centre of stiff mass.



- 8 Design a shear wall for a '5' storey building for following data. Storey Shear at different levels are as follows:

Storey No.	1	2	3	4	5
Storey shear (KN)	5	10	30	80	140

Length of shear wall = 7.5 m

Storey height = 3 m

Seismic weight of building = 55×10^3 kN

Axial load on shear wall = 3×10^3 kN

Building situated at Delhi. Use m-20 grade concrete and Fe415 steel.
