Code: 9A01705

R09

B.Tech IV Year I Semester (R09) Supplementary Examinations, May 2013
EARTHQUAKE RESISTANT DESIGN
(Civil Engineering)
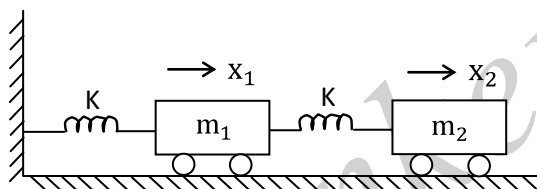
Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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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 IS1893-2002 (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 Fe415steel.
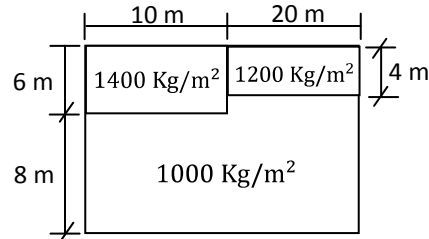
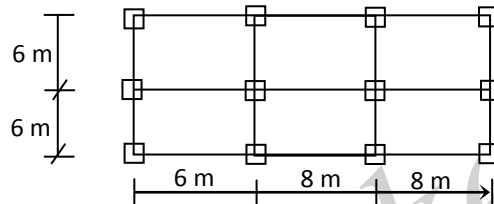|	D.L	L.L	Sesmic load
Axial load (kN)	950	700	550
Moment (kN-m)	50	45	100

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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 mess.

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.

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