

Code No: R05410105

**R05****Set No. 2**

**IV B.Tech I Semester Examinations, November 2010**  
**ANALYSIS AND DESIGN OF STRUCTURES FOR WIND AND**  
**EARTHQUAKE EFFECTS**

Civil Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
 All Questions carry equal marks

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- Why are horizontal bands necessary in masonry buildings?
  - Determine the wind pressure for a bridge having 100 years life, 25m span, located about 15 km from Hyderabad. Also find the design wind force in terms of the width "b" of the bridge. Take  $l/b = 0.5$ . [8+8]
- What are the various requirements of ductile detailing of columns.
  - Write short notes on the following:
    - Design basis earthquake (DBE)
    - Maximum considered earthquake (MCE). [8+8]
- Design a shear wall of length 4.16 m and thickness 250 mm subjected to the following forces. Use M 25 grade concrete and Fe 415 grade steel. The wall is a high wall with the following loadings. Shown in figure 8.

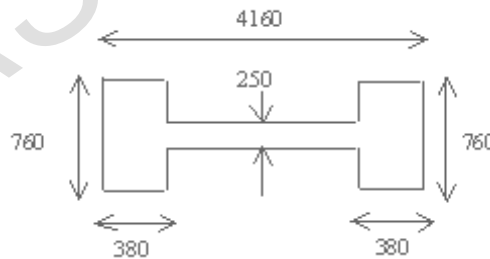


Figure 8

S.No.	Loading	Axial force (kN )	Moment (kN. m)	Shear (kN)
1.	DL + LL	1950	700	20
2.	Seismic load	250	4800	700

[16]

- Determine the natural frequencies and modes of the system shown in the figure 3. Normalize the modes so that  $M_n = 1$ . [16]

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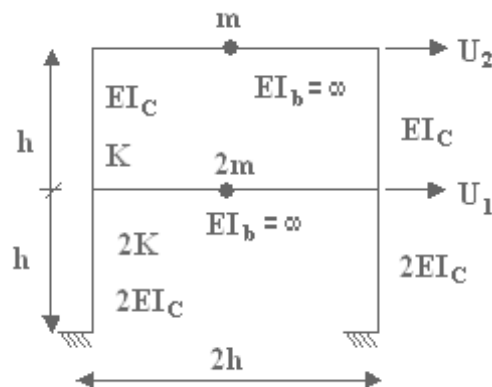
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Figure 3

5. In a multi storey RCC frame building, a typical floor beam with 140 mm thick slab carries service negative bending moment and shear force of 425 kN.m and 330 kN respectively at the face of beam-column joint due to gravity and seismic loads. The size of the beam web has been fixed at 345 mm  $\times$  500 mm from architectural considerations. The effective cover to tension steel is 55mm. Design the beam section for adequate ductility. The materials used are M 20 concrete and Fe 415 steel. [16]
6. (a) Write a detailed note on the LATUR earthquake. Write the Date, Time of occurrence, Location, Magnitude, Intensity, Number of casualties, Extent of damage.  
(b) What is the intensity of an earthquake? Write the approximate empirical correlation between MMI and PGA. [8+8]
7. (a) State Principle of Virtual displacements & Hamilton's principle.  
(b) Derive the expression for the displacement of an undamped free vibrations of SDOF system. Sketch the Response. [6+10]
8. (a) Is it desirable to have high strength concrete in earthquake resistant design of reinforced concrete structures ? Justify your answer.  
(b) Distinguish between the Response spectra and Design spectra. [8+8]

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**R05****Set No. 4**

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**ANALYSIS AND DESIGN OF STRUCTURES FOR WIND AND**  
**EARTHQUAKE EFFECTS**

Civil Engineering

Time: 3 hours

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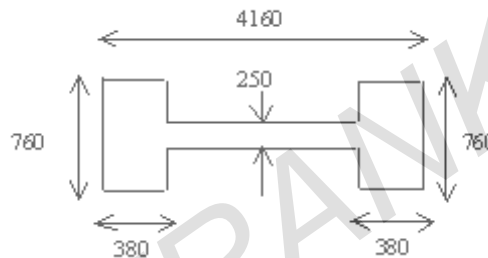


Figure 8

S.No.	Loading	Axial force (kN)	Moment (kN. m)	Shear (kN)
1.	DL + LL	1950	700	20
2.	Seismic load	250	4800	700

[16]

2. Determine the natural frequencies and modes of the system shown in the figure 3. Normalize the modes so that  $M_n = 1$ . [16]

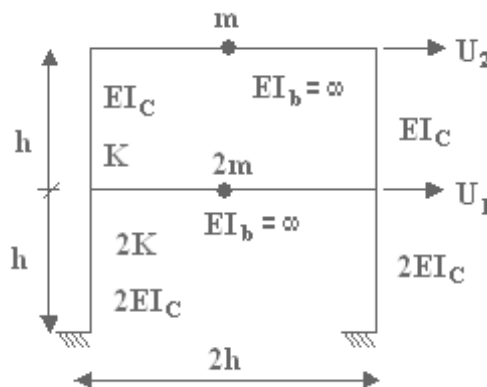


Figure 3

3. (a) Is it desirable to have high strength concrete in earthquake resistant design of reinforced concrete structures? Justify your answer.  
 (b) Distinguish between the Response spectra and Design spectra. [8+8]
4. (a) State Principle of Virtual displacements & Hamilton's principle.

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- (b) Derive the expression for the displacement of an undamped free vibrations of SDOF system. Sketch the Response. [6+10]
5. (a) Why are horizontal bands necessary in masonry buildings?
- (b) Determine the wind pressure for a bridge having 100 years life, 25m span, located about 15 km from Hyderabad. Also find the design wind force in terms of the width "b" of the bridge. Take  $l/b = 0.5$ . [8+8]
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7. (a) What are the various requirements of ductile detailing of columns.
- (b) Write short notes on the following:
- i. Design basis earthquake (DBE)
  - ii. Maximum considered earthquake (MCE). [8+8]
8. (a) Write a detailed note on the Latur earthquake. Write the Date, Time of occurrence, Location, Magnitude, Intensity, Number of casualties, Extent of damage.
- (b) What is the intensity of an earthquake? Write the approximate empirical correlation between MMI and PGA. [8+8]

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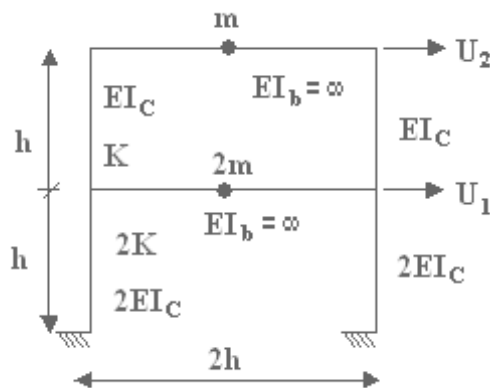


Figure 3

5. (a) Is it desirable to have high strength concrete in earthquake resistant design of reinforced concrete structures? Justify your answer.

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- (b) Distinguish between the Response spectra and Design spectra. [8+8]
6. (a) What are the various requirements of ductile detailing of columns.  
 (b) Write short notes on the following:  
 i. Design basis earthquake (DBE)  
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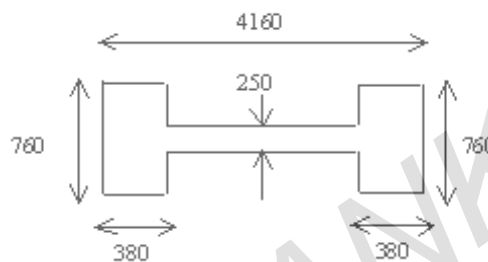


Figure 8

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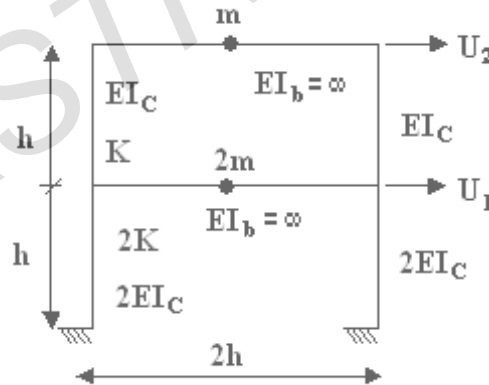


Figure 3

4. In a multi storey RCC frame building, a typical floor beam with 140 mm thick slab carries service negative bending moment and shear force of 425 kN.m and 330 kN respectively at the face of beam-column joint due to gravity and seismic loads. The size of the beam web has been fixed at 345 mm  $\times$  500 mm from architectural considerations. The effective cover to tension steel is 55mm. Design the beam section for adequate ductility. The materials used are M 20 concrete and Fe 415 steel. [16]
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6. (a) Is it desirable to have high strength concrete in earthquake resistant design of reinforced concrete structures ? Justify your answer.  
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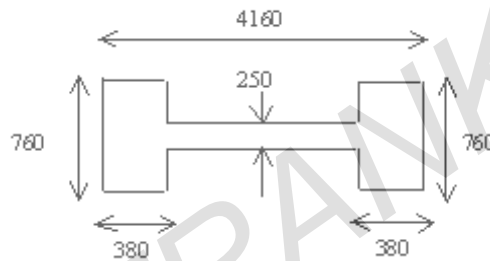


Figure 8

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