M.E. First Semester (Civil (Structural Engg.)) (New-CGS)

13088 : Earthquake Resistant Design of Reinforced Concrete Structures

1 SFSE 5

P. Pages : 2 | **AW - 3888**

Time : Three Hours | Max. Marks : 80

Notes :
1. Answer **three** question from Section A and **three** question from Section B.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answer necessary with the help of neat sketches.
5. I.S.I. Hand book for structural Steel section, I.S. Code 800/1962 or 1964, I.S. 456 (Revised) I.S. 875 may be consulate.
6. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION – A

1. a) Explain in detail Seismic design philosophy for R.C.C. Structure. **7**

b) Explain how confinement of concrete is important in ductility consideration. **6**

2. Explain **any two** points from the following. **14**

a) Supplemental Damping.

b) Redundancy & Over strength

c) Base isolation

3. Design the reinforcement for column of size $300\,mm \times 530\,mm$ subjected to axial loads 900 kN, 400 kN & 250 kN due to dead load, live load and Seismic load respectively. Column also subjected to moment about major axis as 100 kN.m, 55 kN.m and 50 kN.m due to dead load, live load and Seismic load respectively. Column has an unsupported length 3.2 m. Use M 25 concrete and Fe 415 Steel. **13**

4. A R.C.C. frame consist of beams having span of 4.6 m c/c. A typical floor inner beam carries a negative bending moment of 360 kN.m and a shear of 300 kN at the face of the beam. Column joint due to gravity and earthquake loads. Design the beam section for ductility use M 25 concrete and Fe 415 grade steel. **13**

5. Explain with reasons various provisions of ductile detailing consideration for :

a) Column & Footing. **7**

b) Beams **6**

SECTION – B

6. For a RCC framed office building, find the design lateral forces and it's distribution along the height, using static co-efficient method. Consider following data. **14**

i) location : Delhi

ii) Soil condition : Medium soil

iii) Plan dimension : 5 bays of 6 m each along x direction and 6 bays of 5 m each along y direction.

iv) Elevation 6 storey including ground storey each with 3.5 m floor height.

v) Column : 400 mm × 400 mm all

vi) Beams : 300 mm × 400 mm all

vii) Slab : 150 mm thick RCC

viii) Walls : outer wall 230 mm brick masonry, inner 150 mm brick masonry.

ix) Parapet walls : 230 mm thick 1 m ht. brick masonry.

7. Explain **any two** points from the following. **13**

a) Soil Structure Interaction.

b) Effect of Masonry infill.

c) P – detta effect.

8. What is shear wall. Explain with your own example, the procedure for design of shear wall. **13**

9. Explain with your own example the procedure for calculation of wind load on building located at Bhopal. Also explain various load combination required to be considered for wind load. **13**

10. Give technical reasons for the following. **13**

a) Strong column & weak beam design.

b) Soft storey should be avoided in R.C.C. structure.

****