

M.E. First Semester (Civil (Structural Engg.)) (New-CGS) -
13088 : Earthquake Resistant Design of Reinforced Concrete Structures :
1 SFSE 5

P. Pages : 2

Time : Four Hours



AW - 3617

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. I.S.I. Hand book for structural Steel section, I.S. 800/1962 or 1964, I.S. 456 (Revised) I.S. 875 may be consulted. IS - 1893:2002
 5. Use of pen Blue/Black ink/refill only for writing the answer book.

1. Explain in detail the following 14
 - a) Base Isolation
 - b) Supplemental Damping.
2. a) Explain in detail seismic design philosophy for R.C.C. structure. 5
b) Explain how confinement of concrete is important. 8
3. Explain with reasons various ductile detailing considerations as per IS 13920:1993 for flexural members, columns and frame members subjected to bending and axial load. 13
4. Design the beam section for ductility as per is 13920, IS 456 for the following 13
 - i) Concrete : M25
 - ii) Steel : Fe415
 - iii) c/c span : 4300 mm
 - iv) Hogging moment @ beam column joint due to gravity and earthquake load = 219.1 kN.m
 - v) Shear at beam column joint due to gravity and earthquake load = 142 kN
5. Design the column of size 300 mm x 530 mm subjected to axial loads 800 kN, 350 kN & 200 kN due to dead load, live load and seismic load respectively, column also subjected to moment about major axis as 90 kN.m 54 kN.m and 46 kN.m due to dead load, live load and seismic load respectively. column has an unsupported length 3.1m. Use M25 concrete and Fe415 steel. 13

SECTION - B

6. a) Give technical reasons for the following: 13
 - a) Soft - Storey should be avoided in R.C.C structure.
 - b) For R.C.C design strong column & weak beam design approach should be consider.

7. What is shear wall. Explain with your own example, the procedure for design of shear wall. 13
8. Explain following point
- a) Effect of Torsion
 - b) Effect of soil-structure interaction on building response
9. For a R.C.C. framed building find the design lateral forces and it's distribution along the height, using equivalent. Static lateral force method. 14
- i) Location : Roorkee
 - ii) Use : Hospital building
 - iii) Plan dimension : 6 bay of 5m each
along X – direction and 6 bay of 5 m each
along Y – direction
 - iv) Soil condition : Medium soil
 - v) Elevation : 6 storey including ground storey each with 3.2m floor height.
 - vi) Column : 400mmx400mm
 - vii) Beam : 300mmx400mm
 - viii) Walls : Outer wall 230mm brick masonry, inner 150mm brick masonry
 - ix) Parapet wall : 230mm thick 1m ht. brick masonry.
10. a) What are the different factors affecting ductility. 6
- b) What is use of damping. Explain any one device use to in crease damping in structure in detail. 7
