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

13092 : Advanced Design of Steel Structures : 2 SFSE 2

P. Pages : 1

Time : Four Hours

AU - 3450

Max. Marks : 80

`*0959*`

Notes : 1. All question carry equal marks.
2. Answer **any two** question from Section A and **any two** question from Section B.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.
5. Illustrate your answer necessary with the help of neat sketches.
6. Use of electronic calculator is permitted.
7. I.S.I. Hand book for structural Steel section, I.S. Code 800/2007 (Revised) I.S. 875 may be consulate.
8. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION – A

1. Explain allowable stress design, Plastic design and limit state design method. **20**

2. Steel beams with flanges embedded in concrete slab have simply supported span of 7.5m. The $\%_c$ spacing of beam is 4m. It carries RCC slab 150mm thick. The superimposed load is $4 \, kN / m^2$ and floor finish of $1.5 \, kN / m^2$. Yield strength of steel is $250 \, N / mm^2$. Design the section of the internal beam. Shows all checks. Assume any data if required. **20**

3. A nonsway column in a building frame with flexible joint is 4.5m high and subjected to the following load and moment:
   i) Factored axial load = 500kN   ii) Factored moment M_z
   at top of column = 28 kN-m
   at bottom of column = 42 kNm
   Design a suitable beam column assuming $f_y = 250 \, MPa$. Take the effective length of column as 0.8L along both the axes.

SECTION – B

4. Design a welded plate girder 24m in span and laterally restrained throughout. It has to support a factored uniform load of 100 kN/m, throughout the span inclusive of self weight. The steel for the flange and web is of grade Fe410.

5. Design the foot bridge for the following data: **20**
   i) Span = 24m   ii) Width of walkway = 4m
   iii) N-type Lattice girder with 8 panels.   iv) Laterally supported by rakers.
   v) The flooring consist of RCC slab 125 mm thick with floor finish $0.75 \, kN / m^2$.
   vi) Live load = $5 \, kN / m^2$.

6. Proposed a suitable roof truss for an industrial building of size of 16 x 40m. The spacing of trusses is 4m. Use GI sheet as a roofing material. The basic wind pressure is $1.5 \, kN / m^2$. The height of eaves above ground level is 6m. The building is situated in Amravati in plane area and its permeability is normal. Calculate the design load for each member of truss. Assume any data if required. **20**

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