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

# 13092 : Advanced Design of Steel Structure : 2 SFSE 2

AW - 3619

P. Pages : 1

Time : Four Hours

*0386*

Max. Marks : 80

---

Notes :
1. All question carry equal marks.
2. Answer **two** question from Section A and **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. I.S.I. Hand book for structural Steel section, I.S. Code 800/2007, I.S. 456 (Revised) I.S. 875 may be consulted.
7. Use of pen Blue/Black ink/refill only for writing the answer book.

## SECTION – A

1. a) In what sense limit state method of design is more rational than working stress of the ultimate method? **10**

   b) State assumption made in plastic design. **5**

   c) Explain partial safety factor and state partial safety factors according to I.S. provisions in limit state for load. **5**

2. Design a laterally unsupported beam for the following data : **20**
   i) Effective span – 6 m.  ii) Max. bending moment – 450 kN-m.
   iii) Max. shear force – 200 kN.  iv) Steel of grade – Fe 410.

3. A non-sway column in a building frame with flexible joints is 4 m high and subjected to the following load and moment : **20**
   factored axial load – 500 kN
   factored moment $M_z$ :
       At top of column – 27 kN-m
       At bottom of column – 45 kN-m
   Design suitable beam-column assuming Fy-410 N/mm². Take the effective length of column is 0.8 L along both the axes.

## SECTION – B

4. Design a welded plate girder of span 21 m with udl of 50 kN/m and two point load of 150 kN at 7 m from each support. The girder is laterally restrained. Take Fe 410. **20**

5. Design a foot bridge for the following data : **20**
   i) Span = 24 m.  ii) Width of walkway = 3 m.
   iii) N-type Lattice girder with 8 panels, laterally supported by Rakers.
   iv) The flooring consist of RCC slab 100 mm thick with floor finish 0.8 kN/m².
   v) Live load = 5 kN/m².

6. Suggest a suitable roof truss for an industrial building of size 20 x 60 m. The spacing of trusses is 4 m. Use GI sheet as a roofing material. The basic wind pressure is 1.5 kN/m². The height of eaves above ground level is 6 m. The building will be situated in Amravati in plane area and it's permeability is normal. Calculate the design load for each member of truss. Assume any data if required. **20**

\*\*\*\*\*\*\*\*\*\*

AW - 3619

1