

- (d) Discuss the calculation of net effective sections of angles for tension members.
- (e) Explain slenderness ratio of column based on Euler's theory.
- (f) Explain the behaviour of built up column subjected to axial load.
- (g) Discuss the behaviour of unsymmetrical sections in flexural members.
- (h) Explain the shear behaviour of stiffened plate girder.
- (i) Discuss briefly about tubular purlins.
- (j) Discuss the design of connections in aluminium structures. **10×1.5=15**

Roll No.

Total Pages : 04

J-21-0121

B. Tech. EXAMINATION, 2021

Semester VII (CBCS)

LIMIT STATE DESIGN OF METAL STRUCTURES

CE-701

Time : 2 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D. Q. No. 9 is compulsory. Assume any missing data. Use of IS 800-2007, IS 806-2002 and steel tables are allowed.

Section A

1. (a) Discuss the assumptions made in the plastic method used in steel framework.

(b) Discuss the stress strain relationship for mild steel with the help of curve. $2 \times 7.5 = 15$

2. Two plates of 18 mm thickness have been connected in a lap joint using high strength friction grip bolts. Design the joint so as to transmit a pull equal to full strength of the plate. **15**

Section B

3. Design a tension member consisting of a pair of angles and connected by their short legs to each side of the gusset plate. The member is to carry a pull of 160 kN. **15**
4. A column section HB 350 @ 0.674 kN/m is carrying an axial load of 900 kN. It is to be supported over a column section HB 450 @ 0.872 kN/m. Design the column splicing. **15**

Section C

5. A section MB 550 @ 1.037 kN/m has been used as simply supported beam over a span of 4m. The ends of beam are restrained against torsion but not against lateral bending. Determine the safe uniformly distributed load per metre length which the beam can carry. **15**

6. Design a suitable base for a column carrying an axial load of 260 kN and a moment of 22000 kN-mm in place of the web. The section of the column is HB 400, @ 0.822 kN/m. **15**

Section D

7. A tubular column consists of IS:1161 grade St.35 steel. The column is hinged at both the ends. The outside diameter of tube is 193.7 mm. The weight of 1m length of tube is 273 N. The length of column is 4.2 m. Determine the safe load carrying capacity of the column. **15**
8. Write short notes on the following :
- (a) Joints in tubular trusses
 - (b) Permissible stresses in Aluminium structures.
- 2 × 7.5 = 15**

(Compulsory Question)

9. (a) Discuss the features of Limit state design of steel members.
- (b) Discuss the permissible stresses in steel.
- (c) What are welded connections ?