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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Civil) (Sem.-5)

DESIGN OF STEEL STRUCTURES - I

Subject Code : CE-303

Paper ID : [A0613]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**1. Answer briefly :**

- a) What is the difference in the behavior of long column and short column?
- b) What is meant by shape factor of a section?
- c) How you can designate bolts?
- d) What are the different types of failures of tension members?
- e) Define slenderness ratio.
- f) State the functions of column bases.
- g) Define efficiency of Joint.
- h) What is meant by web-crippling? When torsion does occur in a beam?
- i) What is the main purpose of Gantry girder? List the load that should be considered while designing a Gantry Girder.
- j) What is lacing and its significance?

SECTION-B

2. Explain with the neat sketch and nomenclature the different types of roof trusses.
3. A 8mm thick angle section is joined to a 10mm thick gusset plate. Angle is supporting a load of 70 kN. Find out number of 18mm diameter rivets required for the connection.
4. A column section ISHB 350@ 661.2 N/m carries an axial load of 1000 kN and bending moment of 60 kN-m. Design a suitable base plate using welded connections.
5. A single unequal angle $100 \times 75 \times 6$ mm is connected to a 10 mm thick gusset plate at the ends with six 16 mm diameter bolts to transfer tension as shown in Figure. Determine the design tensile strength of the angle assuming that the yield and the ultimate stress of steel used are 250 MPa and 410 MPa if gusset plate is connected to the 100 mm leg. Take $g = 60$ mm.

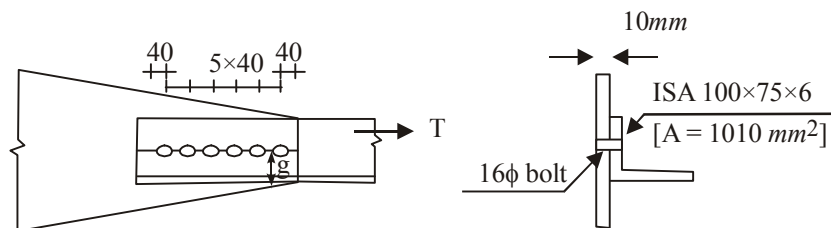


Figure - 1

6. A welded plate girder has a simply supported span of 20 m. It carries a uniformly distributed load of 400 kN/m inclusive of its weight. The depth of plate girder is restricted to 1600 mm. Design a suitable section.

SECTION-C

7. Design the purlins of a truss. It is given that the length of the purlin is 5 m. The dead load, live load and wind load are 301.7 N/m, 620 N/m and -18373 N/m respectively.
8. Write short notes (any TWO) :
 - a) Design of purlins.
 - b) Intermediate Stiffness.
 - c) Design of columns using battening system.
9. Design a simply supported beam of 8 m span carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The total u.d.l. is made up of 100 kN dead load including self weight and 150kN live load. In addition, the beam carries a point load at mid span made up of 50kN dead load and 50kN imposed load. Assume stiff bearing length of 75 mm.