

III B.Tech. II Semester Regular Examinations, November-2005

STRUCTURAL ENGINEERING-II (STEEL) DESIGN AND DRAWING

Time: 3 hours

Max Marks: 80

PART-A

**Answer any ONE question from PART-A [32Marks]
And any THREE questions from PART-B [48Marks]
IS-800-1984 to be permitted**

PART-A(Bridges)

(Marks:32)

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1. A column ISMB 350 carries an axial load of 1000 KN at the base end of the column. The base plate is connected to the column flange by two ISA 100 x 100 x 75mm thick angles with 26 mm rivets. Design the slab base and concrete pedestal for the column. Use M25 concrete and the safe bearing capacity of soil as 180 KN/m². Draw to scale:
- a) The top view of the connection. [24]
 - b) The side views showing concrete pedestal. [8]

(OR)

- 2.a) Design the cross section of a plate girder for the following data :
Effective span of the girder=20 m
Superimposed loading = 45 kN/m
Design the connection and longitudinal section of the girder to a suitable scale showing intermediate stiffeners. [24]
- b) Draw to scale the cross section and longitudinal section of the girder showing the intermediate stiffeners and bearing stiffeners. [8]

PART-B

(Marks:48)

- 3.a) With neat sketches explain various fillet and butt welds. [6]
- b) A bracket comprising of two plates connecting to both the sides of a column ISMB 300 is carrying a reaction of 150 kN. The load is acting at 150 mm from the center of the web of the column and is inclined at 30 degrees to the horizontal. Design the riveted connection. The thickness of the bracket plates is 10mm. [10]
- 4.a) Explain curtailment of flange plates and its importance? [4]
- b) Design a laterally unsupported beam for an effective span of 5m to carry a superimposed load of 25 kN/m and a point load of 10kN at mid point. The ends are restrained against lateral bending and torsion. Check the suggested section for web buckling. [12]

Contd..2

- 5.a) What is the main difference in design procedure of a tension member and a compression member. [4]
- b) Design a double laced column for a load carrying capacity of 1500 kN the effective length of the column is 4m. Use channel sections such that the flexural rigidity of the section is same in both the direction. Design lacing system also. [12]
6. Design a gantry girder for an industrial building to carry a hand-operated overhead traveling crane with the following data. [16]
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|-----------------------|---------|--------------------------------|----------|
| Crane capacity | =150 kN | Weight of crane excluding crab | = 100 kN |
| Weight of crab | = 50 kN | Span of crane between rails | = 10 m |
| Wheel base | =3.0 m | Minimum hook approach | = 1.2m |
| Span of gantry girder | =7.5 m | Weight of rail section | = 20kg/m |
- Check the suggested section for bending stresses.
7. Explain procedure for calculation of dead load on the roof trusses due to
- Galvanized iron sheet
 - Asbestos sheet
 - Corrugated galvanized iron sheet
 - Truss
 - Purlin for industrial building.
