

R13

Code: 13A01601

B.Tech III Year II Semester (R13) Regular Examinations May/June 2016

DESIGN & DRAWING OF STEEL STRUCTURES

(Civil Engineering)

Time: 3 hours

Max Marks: 70

Use of IS 800:2007, IS:875 (Part III)-1987, structural steel tables is to be permitted in the examination hall

PART – A

(Answer any one question, 1 × 28 marks)

- 1 Design a welded plate girder 24 m in span and laterally restrained throughout. It has to support a uniform load of 100 kN/m throughout the span exclusive of self weight. Design the girder without intermediate transverse stiffeners. The steel for the flange and web plates is of grade Fe415. Yield stress of steel may be assumed to be 250 MPa irrespective of the thickness plates used. Design cross section, connection and the end load bearing stiffener. Sketch to a scale the longitudinal section and cross section of the girder and typical arrangement of stiffness.
- 2 Design a laced column 10 m long to carry a factored axial load of 1100 kN. The column is restrained in position but not in direction at both ends. Provide single lacing system with bolted connection. Design the lacing system with welded connections for channels back to back. Draw:
 - (a) Plan.
 - (b) Section elevation of the column.
 - (c) Cross section of the column.

PART – B

(Answer any three questions, 3 × 14 marks)

- 3
 - (a) What are the advantages of welded connections?
 - (b) A tie member of a roof truss consists of 2 ISA 10075, 8 mm. the angles are connected to either side of a 10 mm gusset plates and the member is subjected to a working pull of 300 kN. Design the welded connection.
- 4 Design a simply supported beam section of span 4 m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The U.D.L is made up of 20.0 kN/m imposed load and 20 kN/m dead load. Assume Fe415 grade steel.
- 5 Design a stiffened seat connection to join ISMB 350@514 N/m with a column section ISHB 300@576.8 N/m. The beam transmits an end reaction of 320 kN due to factored loads. Assume Fe415 grade steel.
- 6 Design the slab base for a column consisting of ISHB 350@661.2 N/m carries an axial compressive factored load of 1700 kN. Design a gusset base. The base rests on M15 grade concrete pedestal and use 24 mm diameter bolts of grade 4.6 for making the connections.
- 7 Explain step by step procedure how to design a gantry girder as per IS code.
