

Code: 13A01601

B.Tech III Year II Semester (R13) Supplementary Examinations December 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 are to be permitted in the examination hall

**PART – A**

(Answer any one question, 1 × 28 marks)

\*\*\*\*\*

- 1 Define a built up battened column to carry an axial load of 2450 kN. Length of column is 4.85 m. It is effectively held in position at the ends but restrained against rotation at one end only. Take  $f_y = 250 \text{ N/mm}^2$ . For the built up column also design the battens.  
Draw:  
(a) Plan of the built up column.  
(b) Elevation for the column.
- 2 Design a gantry girder for a mill building to carry an electric over head travelling crane having following data:  
Crane capacity = 250 kN  
Weight of crane excluding crab = 200 kN  
Weight of crab = 60 kN  
Span of crane between rails = 20 m  
Minimum hook approach = 1.1 m  
Wheel base = 3.4 m  
Span of gantry girder = 7.0 m  
Mass of rail section = 30 kg/m  
Height of rail section = 75 mm  
Take  $f_y = 250 \text{ MPa}$  and  $E = 2 \times 10^5 \text{ MPa}$   
Draw cross section of gantry girder.

**PART – B**

(Answer any three questions, 3 × 14 marks)

- 3 An unequal angle 1.5 m long of a truss is connected to a gusset plate. It carries ultimate tension of 230 kN. Design the section using bolted connection. Take  $f_y = 250 \text{ MPa}$  and  $f_u = 410 \text{ MPa}$ .
- 4 A welded crane bracket support a load of 120 kN at a distance of 150 mm from the edge of a column ISWB 300, using 15 mm thick plate. Design the connection.
- 5 Design a steel column to carry an axial load of 2000 kN. The length of the column is 5.0 m and effectively held in both ends.
- 6 Design a welded plate girder without stiffness and also end bearing stiffness for an effective span of 30 m and carrying a u.d.l of 30 kN/m and two concentrated loads of 150 kN each acting at 10 m from both ends. The girder is simply supported at ends. It is fully restrained at both ends against lateral buckling throughout the span. Take load factor and yield stress as 1.5 and 250 MPa.
- 7 Design the suitable slab base for a column having one ISHB 300 @ 63 kg/m and two cover plates of 350 mm x 25 mm. The column carries an axial load of 2400 kN. Assume the permissible bearing stress for slab base as 1890 kg/cm<sup>2</sup>.

\*\*\*\*\*