Code: 9A01601

R09

B.Tech III Year II Semester (R09) Supplementary Examinations December/January 2015/2016
DESIGN & DRAWING OF STEEL STRUCTURES
(Civil Engineering)

Time: 3 hours   Max Marks: 70

Use of IS 800:2007, IS 806-1968, IS:875 (Part III)-1987, structural steel tables are to be permitted in the examination hall

PART – A
(Answer any one question, 1 x 28 marks)
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1   A simply supported welded plate girder having a span of 14 m has to support concentrated loads of 100 kN each from cross girder at 2 m intervals. In addition, the girder has to carry a U.D.L of 18 kN/m including its own self weight. Design the cross section of the plate girder and suitable stiffeners. Draw dimensional sketches showing the longitudinal elevation and cross section of the girder.

2   Design a gusset base for the column section consisting of one SC 250 with two cover plates 300 x 25 mm carrying an axial load of 2500 kN. SBC of soil is 250 kN/m^2 and permissible bearing pressure on concrete is 4000 kN/m^2.
  (a) Side view of gusseted base.
  (b) Plan view of gusseted base.

PART – B
(Answer any three questions, 3 x 14 marks)

3   Figure shows below an arrangement to support a bracket plate. The load applied to the bracket plate is 100 kN. Find the greatest resistance offered by the weld per mm length if 6mm fillet welds are used for the greatest stress intensity in the weld.

Fig.
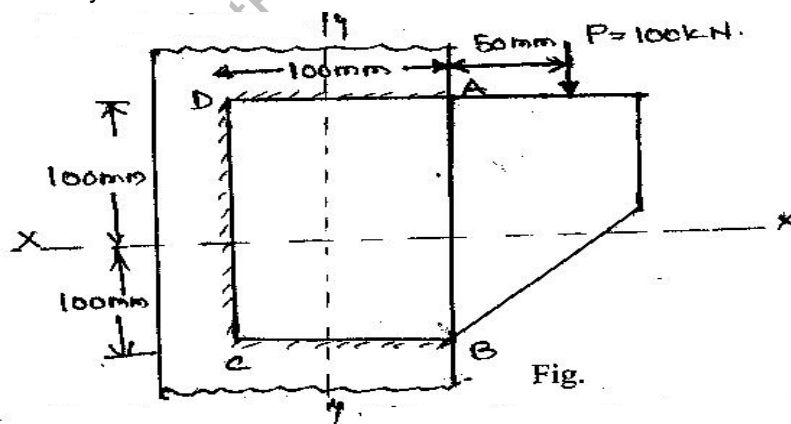
4   Design a beam with 6.5 m effective span, carrying a uniform load of 40.0 kN/m inclusive of self weight over the entire span. The overall depth of the beam is restricted to 350 mm. The compression flange of the beam is laterally supported through out. (fy = 250 N/mm^2).

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5 A tension member carrying a tension of 160 kN consists of two angels. Design the member: (i) If the angles are connected on opposite sides of the gusset plate. (ii) The angle are connected on the same side of the gusset plate.

6 A tension member carrying a tension of 22.5 kN meets the principal rafter in a truss carrying a compressive force of 83.5 kN. Design the members. The panel length of the principal rafter is 1.75 m. Design also the welded joint if the tension member meets the principal rafter at right angles.

7 Design a simply supported gantry girder to be used in an industrial building for the following data:

Crane capacity	= 100 kN
Weight of crab	= 35 kN
Weight of crane (excluding crab)	= 160 kN
Minimum clearance between crane hook and gantry girder	= 1.0 m
Wheel base	= 3.0 m
Distance between c/c of gantries	= 20.0 m
Distance between c/c of gantry columns	= 6.0 m
Crane type	= M.O.T.

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