Code: 9A01601

R09

B.Tech III Year II Semester (R09) Supplementary Examinations May/June 2017
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 × 28 marks)
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1   Design a gusseted base for the following data:

Cross section of the column ISMB 400 with 200 x 10 mm cover plates on each flange.

Load acting on the column = 1200 kN

Strength of concrete pedestal = 6 N/mm^2

Draw to plan, side elevation of the gusseted base.

2   A deck type welded plate girder of a railway bridge is to be constructed. The following data is available.

Effective span = 20 m, c/c distance between plate girders = 2 m

Lateral load = 9000 N/m, Design BM for each plate girder = 4000 kN/m

Design SF for each plate girder = 880 kN

Design the plate girder and show the cross section and longitudinal elevation.

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

3   (a)   Explain about lap joints.

(b)   A plate girder simply supported at ends having a span of 15 m consists of a web plate 700 mm x 12 mm and a flange plate 300 mm x 18 mm for each flange. The girder carries an all inclusive load of 45 kN/m run. Find the size of the weld required for connecting the flange plates to the web plates, near the supports. Use 10 mm fillet welds. Permissible shear stress in weld is 110 N/mm^2.

4   Design a simply supported plated rolled steel beam section to carry a U.D.L 50 kN/m inclusive of self weight of beam. The effective span of beam is 10 m. The depth of the beam should not be more than 500 mm. The compression flange of the beam is laterally supported by floor construction.

5   Design a tension member consisting of a pair of angels (back to back) and connected by the short legs to the same side of gusset plate. The member is to carry a pull of 250 kN.

6   Design a built up column with two channels back to back. The column is of 6.6 m effective length and supports a load of 1080 kN. Also design the lacing.

7   (a)   Explain design principles of gantry girder.

(b)   Write about the loads on a gantry girder.