Code No: R1632011 **R16** SET - 1

III B. Tech II Semester Supplementary Examinations, April - 2021

DESIGN AND DRAWING OF STEEL STRUCTURES

(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: i) Answer any ONE Question from Part – A and any THREE Questions from Part – B
ii) Use of IS 800:2007, IS: 875 (Part III)-1987, structural steel tables is to be permitted in the examination hall.

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PART –A (28 Marks)

1 Design a welded plate girder of 30.0 m span. It is subjected to a uniformly distributed load of 32 kN/m. Design also their stiffeners and connections. Draw plan and sectional elevation. [28M]

(OR)

2 Design a built up column with four angles. The column is 12.0 m long and supports a factored axial compressive load of 800 kN. The ends of the column are held in position and restrained against rotation. Draw to scale the cross-section and sectional elevation of the column with batten details. [28M]

PART –B (42 Marks)

3 a) Write about advantages of welding. [4M]

b) A 120 mm diameter and 6 mm thick pipe is fillet welded to a 14 mm plate. It is subjected to a vertical factored load of 5.0 kN at 1.0 m from the welded end and a factored twisting moment of 1.8 kNm. Design the joint assuming shop welding. [10M]

4 Design a simply supported beam of span 6 m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The uniformly distributed load is made up of 15 kN/m imposed load and 12 kN/m dead load (section is stiff against bearing). [14M]

5 A tension member 1.0 m long is to resist a service dead load of 20 kN and a service load of 50 kN. Design a rectangular bar of standard structural steel of grade Fe 410. Assume that the member is connected by one line of 16 mm diameter bolts of grade 4.6. [14M]

6 Design the suitable of steel column and suitable base for an axial compressive factored force of 2000 kN. The effective length of column is 5 m. Use M30 grade concrete pedestal. [14M]

7 Design a simply supported gantry girder to carry an electric overhead travelling crane for the data given: crane capacity:320 kN, Weight of crane and crab:300 kN, Weight of crane:200 kN, minimum approach of crane hook:1.2 m, distance between c/c of wheels:3.0 m, distance between c/c of gantries:16.0 m, span of gantry girder:4.0 m, weight of rails 300 N/m and Height of rail 75mm. [14M]

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