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

III B. Tech II Semester Regular/Supplementary Examinations, August - 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 built up column with two channels toe to toe to carry a factored load of 2000 kN. Take the effective length as 5.0 m. Draw to scale the cross-section and sectional elevation of the column with lacing details. [28M]

2. Design a welded plate girder for a simply supported bridge deck beam with a clear span of 20 m. Dead Load including self weight = 20kNm and imposed load = 12kNm. Two moving load of 125 kN each spaced 2m apart. Assume the top compression flange of the plate girder is restrained laterally and prevented from rotating. Design as an unstiffened plate girder with thick welds. Draw plan and sectional elevation. [28M]

PART – B **(42 Marks)**

3. Design a connection to joint two plates of size 250x12 mm of grade Fe 410 to mobilize full plate tensile strength using shop fillet welds if: (i) a lap joint is used; (ii) a double cover butt joint is used. [14M]

4. Design a simply supported beam of span 5 m carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The uniformly distributed load is made up of 20 kN/m imposed load and 20 kN/m dead load (section is stiff against bearing). [14M]

5. Design a tension member to carry a factored tensile load of 400 kN. Two angles placed back to back with long legs outstanding are desirable. The length of the member is 3.0 m. [14M]

6. A column ISHB 350 @661.2 N/m carries an axial compressive factored load of 1700 kN. Design a suitable bolted gusset base. The base rests on M-20 grade of concrete. Use 24 mm diameter bolts of grade 4.6 for making the connections. [14M]

7. a) What is the difference between surge load and drag load of cranes? [4M]
   b) Write down the various steps involved in the design of a gantry girder. [10M]

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