

Code: CE6T2

**III B.Tech - II Semester – Regular/Supplementary Examinations  
March 2020**

**DESIGN AND DRAWING OF STEEL STRUCTURES  
(CIVIL ENGINEERING)**

**Use of IS 800-2007 & IS: 875 - Part III and Steel Tables are allowed**

Duration: 3 hours

Max. Marks: 70

**PART – A**

Answer any *ONE* question.

1 x 28 = 28 M

1. Design a laced column 10 m long to carry a factored axial load of 1200kN. The column is restrained in position but not in direction at both ends. Provide single lacing system with bolted connection. (a) Design the column with two channels back to back, (b) Design the column with two channels placed toe-to-toe, and (c) Design the lacing system with welded connections for channels back to back. Also draw the detailing of sections.

**OR**

2. A proposed cantilever beam is built into a concrete wall and free at its ends. It supports dead load of 20kN/m and a live load of 10kN/m. The length of the beam is 5m. select an available section with necessary checks (a) check for shear, (b) check for deflection, (c) check for buckling, and (d) check for bearing. Assume bearing length of 100mm. Also draw the detailing of sections.

## PART – B

Answer any *THREE* questions. All questions carry equal marks.

$$3 \times 14 = 42 \text{ M}$$

3. An angle section ISA 80mm x 50mm x 8mm is welded to a 12mm thick gusset plate at site. Design the weld to transmit the load equal to the strength of the members. Take grade of steel 410. 14 M
  
4. Design an 8m long tension member subjected to a tensile load of 1500kN. Use channel sections and flange plates. Take steel of grade 410 and bolts of grade 4.6. 14 M
  
5. A simply supported beam has an effective span of 6m and carries a UDL of 30kN/m. Design the beam if it is laterally unsupported. 14 M
  
6. Design a laced column with two channels back to back of length 8m to carry an axial load of 1500kN. The column is hinged at both ends. 14 M
  
7. A 20m long plate girder has to support a UDL and concentrated loads at one third points. The uniform load consists of 18kN/m dead load and 30kN/m live load. Each concentrated load consists of a 125kN. Using grade 410 steel determine the following:
  - a) Design the cross section, and
  - b) Determine the location and size of intermediate stiffeners.14 M