

Code: CE6T1

III B.Tech - II Semester – Regular Examinations – May 2015

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

Duration: 3 hours

Max. Marks: 70

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

PART – A

Answer any **ONE** question. $1 \times 28 = 28$ M

1. Design a laced column of 10m long to carry a factored load of 1100kN. The column is restrained in position but not in direction at both ends. Use two channel sections placed toe-to-toe. Design lacing system also. Draw the cross section and elevation. 28 M
2. Design a gusseted base under a column carrying an axial load of 1200kN. The column section consists of ISMB400 with plates 250mm x 12mm on each side of the I-section. The allowable pressure of the concrete pedestal is 4.5N/mm^2 . Design required connections at column and base plate. Also draw plan and both side elevations of gussets plates and base plate. 28 M

PART – B

Answer any **THREE** questions. All questions carry equal marks. 3 x 14 = 42 M

3. A tie member of a truss consisting of an angle section ISA 65 x 65 x 6 of Fe410 grade is welded to an 8mm gusset plate. Design a weld to transmit a load equal to full strength of the member. Assume shop welding. 14 M

4. Design a purlin of a roof truss for an industrial building located at Vijayawada with a span of 20m and a length of 50m. The roofing is galvanised iron sheeting. Basic wind speed is 50m/s and the terrain is an open industrial area. The building is **class B** with a clear height of 8m at the eaves. 14 M

5. A Tension member in a bridge structure 10m long is subjected to an axial tensile load of 1200kN. Design the section with channels facing each other. Assume $f_y=250$ MPa. 14 M

6. Design a simply supported beam of 7m span carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The total udl is made up of 25kN/m. In addition to this the beam carries a point load at mid span is 100kN. Assuming a stiff bearing length of 75mm. 14 M

7. Design a gantry girder, without lateral restraint along its span to be used in an industrial building carrying an overhead travelling crane for following data. 14 M

Span of gantry girder	7.50m
Crane capacity	300 kN
Self-weight of the crane girder excluding trolley	200 kN
Self-weight of trolley, electrical motor, hook	40 kN
Minimum hook approach	1.2 m
Distance between wheel centers	3.5 m
C/C distance between gantry rail (span of crane)	15 m
Self weight of the rail section	300 N/m
Yield stress of steel	410 MPa