

Seat No.	
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T.E. (Civil) (Part - III) (Semester - V) Examination, April - 2016
DESIGN OF STEEL STRUCTURES (Revised)

Sub. Code : 66236

Day and Date : Saturday, 30 - 04 - 2016

Total Marks : 100

Time : 10.30 a.m. to 01.30 p.m.

- Instructions:
- 1) All questions Compulsory.
 - 2) Use of IS : 800-2007, IS: 875, Steel table, Non programmable calculator permitted.
 - 3) Figure to the right indicate full mark.
 - 4) Draw sketches wherever necessary.
 - 5) Assume suitable data if required.

SECTION - I

- Q1)** a) What are the advantages of steel structures over other type of structures? [4]
- b) Design welded connection for an angle 75 x 75 x 8 carrying an axial tensile load of 100kN connected to one side of gusset plate 8mm thick. [6]
- c) Explain how wind load on roof truss estimated. [6]

- Q2)** a) Explain step by step procedure to be followed in the design of tension member. [6]
- b) Design a tension member to carry factored load of 400kN, consisting of pair of equal angles back to back connected to opposite side of gusset plate by weld. Design connections & draw neat sketch. [12]

OR

- b) A tension member consists of 2ISA 80x80x10 connected to same side of 12mm thick gusset plate by 8 number of M24 grade class 4.6 bolts. The yield and ultimate strength of material is 250 Mpa and 410 Mpa respectively. Determine the tensile strength of member. Assume edge distance as 50mm and pitch as 80mm c/c.

P.T.O.

- Q3) a) Describe in brief classification of sections and buckling class of cross sections as per IS:800:2007. [6]
- b) Design a double angle discontinues strut to carry a factored axial compression of 175 kN. The length of strut between the centre of intersection is 3 m. [10]

SECTION - II

- Q4) a) Write step by step procedure to design Lacing system for built up columns. [6]
- b) Determine the load carrying capacity of a compound column consisting of ISMB 400 @ 61.6 kg/m with cover plate 300x20mm on each flange and having a length of 5m . One end of the column is fixed and other is pinned. Assume $f_y = 250\text{Mpa}$. Consider the section as semi compact.[12]

OR

- b) A column carries an axial load of 2000 kN. Design a gusseted base for column which consists of ISHB 350 @ 710 N/m with two flange plates of 450x20mm. The column is supported on concrete pedestal. The grade of concrete is M20.
- Q5) a) Differentiate between laterally supported beam and laterally unsupported beam with neat sketch. [4]
- b) The roof of a hall of 12m x 8m consists of a RC slab 100mm thk. And a 50mm floor finish. The slab is supported on steel beams spaced at 3 m centre to centre. The live load on the slab is 2KN/sqm . Design an intermediate steel beam I section. Assume that the slab provides adequate lateral restraint to the compression flange of the steel beam. [12]

- Q6)** a) State and briefly explain the loads acting on gantry girder. [4]
- b) The Crane system has the following data. Determine the design forces acting on it. [12]
- i) Crane capacity — 250kN
 - ii) Weight of crane — 250kN
 - iii) Weight of crab — 60kN
 - iv) Minimum hook Approach 1.2m
 - v) Wheel base — 3.2m
 - vi) Spacing of columns — 6m
 - vii) Weight of rail section — 0.3kN/m
 - viii) Crane is electrically operated.

