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Seat No.	
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T.E. (Civil) (Semester - V) (New)
Examination, May - 2017
DESIGN OF STEEL STRUCTURES
Sub. Code : 66236

Day and Date : Tuesday, 16 - 05 - 2017

Total Marks : 100

Time : 10.00 a.m. to 1.00 p.m.

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

SECTION - I

- Q1) a) Explain philosophy of limit state design for strength and serviceability. [4]
b) State advantages and disadvantages of welded connection. [4]
c) Two plates 200mm × 8mm are to be connected by 16mm dia. bolts in a lap joint. The factored load transmitted by the joint is 160 KN. Design the joint. [8]
- Q2) a) Explain in brief the [6]
i) shear lag effect,
ii) Net effective sectional area
b) Find out the design tensile strength of angle ISA 80 × 50 × 8 connected to gusset plate with shorter leg by 5mm weld as shown in fig.1. [12]

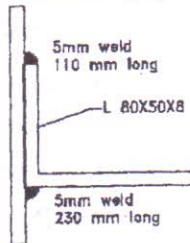


fig. 1

OR

P.T.O.

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- b) The tension member of a truss is 3.75m long is subjected to a factored tension of 350 KN. Design the section which shall consist of a single angle. The angle is to be connected to 10mm gusset plate with 20mm dia. bolts. The member is likely to be subjected to stress reversal due to wind load. [12]
- Q3) a)** Describe the procedure to determine design strength of a compression member. [4]
- b) Design a double angle strut 3m long between intersections for a factored compressive load of 200 kN. The member is to be connected at each end to 10mm plate with 20mm dia. bolts of 4.6 grade. Take $f_y = 250\text{MPa}$. [12]

SECTION - II

- Q4) a)** Discuss general requirement for battening system as per IS 800. [6]
- b) Design a 8m long built up laced column to carry a factored axial load of 1250 KN. The column is restrained in position but not in direction at each end. The column shall consist of two channels placed back to back at a suitable spacing. [12]

OR

- b) An ISHB 350 @710.2 N/m column carries a factored axial load of 2000KN. Design a gusseted base plate with bolted connection. The design bearing strength of the pedestal is 9 N/sqmm. [12]
- Q5) a)** Explain the failure modes of the beam. [4]
- b) A simply supported beam of span 6m has its compression flange laterally supported. It has to support the following loads: [12]
- Dead load excluding the self wt. of beam = 80 KN
Point load at mid span = 165 KN
Live Load = 120 KN
Design the beam.

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- Q6) a)** Draw neat sketch of crane gantry girder system and list the various forces acting on it. **[4]**
- b) The Crane system has the following data. Determine the design forces acting on it. **[12]**
- i) Crane capacity - 100kN
 - ii) Weight of crane - 90kN
 - iii) Weight of crab - 20kN
 - iv) Minimum hook Approach - 1.1m
 - v) Wheel base - 2.5m
 - vi) Span of gantry girder - 5.5m
 - vii) Weight of gantry girder - 8 kN
 - viii) Crane is electrically operated
 - ix) c/c spacing of crane rails = 18m

