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09ENG6.5

Sixth Semester B.Arch. Degree Examination, June/July 2015
Structures – VI

Time: 3 hrs.

Max. Marks:100

- Note:** 1. Answer any FIVE full questions.
2. Missing data, if any, may be suitably assumed.
3. Use of IS – 800 : 2007 and Steel table is permitted.

- 1 a. Explain advantages and disadvantages of bolted connections. (05 Marks)
b. Design a lap joint between the two plates each of width 120 mm, if the thickness of one plate is 16 mm and the other is 12 mm. The joint has to transfer a design load of 160 kN. The plates are of Fe410 grade. Use M₁₆ bolts of grade 4.6. (15 Marks)
- 2 a. What are the modes of failure in bolted connection? (06 Marks)
b. A bracket plate bolted to a vertical column is loaded as shown in Fig. Q2(b). If M20 bolts of grade 4.6 are used, determine the maximum value of factored load P which can be carried safely. (14 Marks)

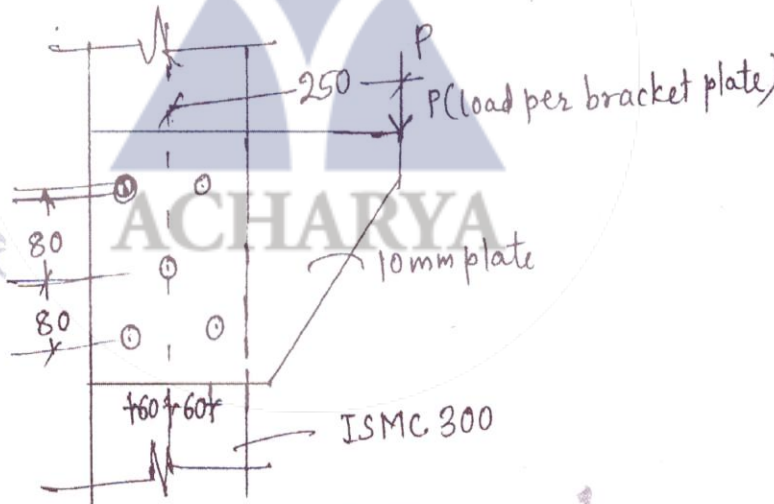


Fig.Q2(b)

- 3 a. What are different types of welded joints? Draw neat sketches. (06 Marks)
b. A tie member of a roof truss consists of 2 ISA 100 × 75 × 8 mm. The angles are connected to either side of a 10 mm gusset plates and the member is subjected to a working pull of 300 kN. Design the welded connection. Assume connections are made in the workshop. (14 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 4 Determine the tensile strength of a roof truss member 2ISA 90 × 60 × 6 mm connected to the gusset plate of 8 mm thickness by 4 mm weld as shown in Fig. Q4. The effective length of weld is 200 mm. (20 Marks)

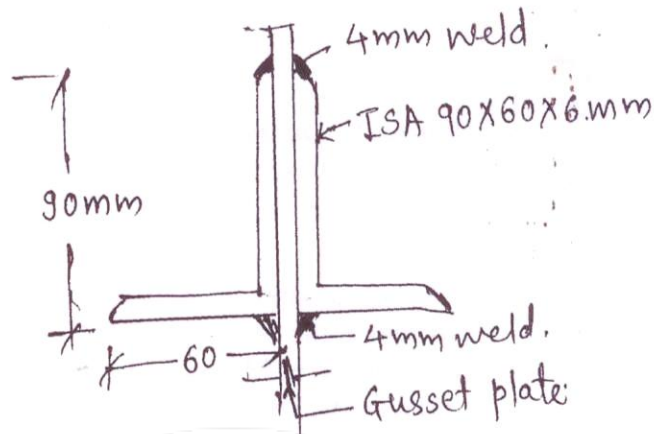


Fig.Q4

- 5 a. Give design steps in lacing system. (08 Marks)
 b. In a truss a strut 3 m long consists of two angles ISA 100 × 100 × 6 mm. Find the factored strength of the member if the angles are connected on both sides of 12 mm gusset by welding. (12 Marks)
- 6 Design a slab base for a column ISHB 300 @ 577 N/m carrying an axial factored load of 1000 kN. M₂₀ concrete is used for foundation. Provide welded connection between column and base plate. (20 Marks)
- 7 A roof of a hall measuring 8 m × 12 m consists of 100 mm thick R.C. slab supported on steel I – beam spaced 3m apart c/c. The finishing load may be taken as 1.5 kN/m² and live load as 1.5 kN/m². The beam is supported on 300 mm wall. Design the steel beam. (20 Marks)
- 8 Write short notes on :
 a. Lap joint and butt joint in bolted connection
 b. Advantages and disadvantages of welded connection
 c. Difference between limit state method and working stress method
 d. Fire protection for steel structures. (20 Marks)
