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09ENG65

Sixth Semester B.Arch. Degree Examination, Jan./Feb. 2021
Structures - VI

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer any FIVE full questions.***
2. ***Use of IS 800 – 2007 , SP6 and steel table are allowed.***
3. ***Assume missing data suitably.***

1 a. Define : i) Pitch of bolts ii) Gauge distance iii) Edge distance iv) End distance v) Staggered distance. **(05 Marks)**

b. Find the efficiency of the lap joint shown in fig. Q1(b). Given M_{20} bolts of grade 4.6 and plate of grade Fe410 (E250) are used. **(15 Marks)**

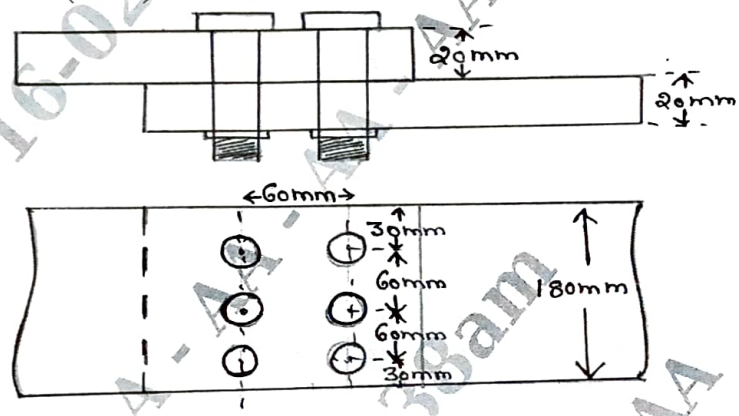


Fig. Q1(b)

2 a. List the different Rolled steel sections. **(05 Marks)**

b. A bracket plate bolted to a vertical column is loaded as shown in fig. Q2(b). If M_{20} bolts of grade 4.6 are used, determine the maximum value of factored load 'P' which can be carried safely. **(15 Marks)**

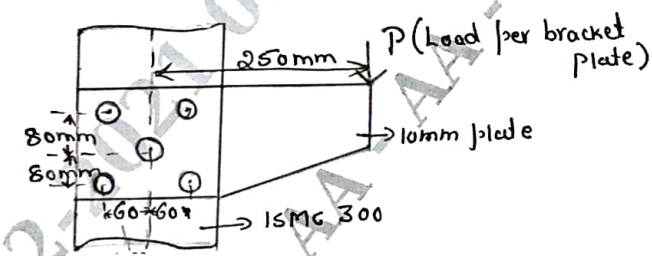


Fig. Q2(b)

3 a. Explain the advantages and disadvantages of Welded Connection. **(06 Marks)**

b. Design a suitable longitudinal fillet weld to connect the plates as shown in fig. Q3(b) to transmit a pull equal to the full strength of small plate. Given plates are 12mm thick, Grade of plates Fe410 and welding to be made in workshop. **(14 Marks)**

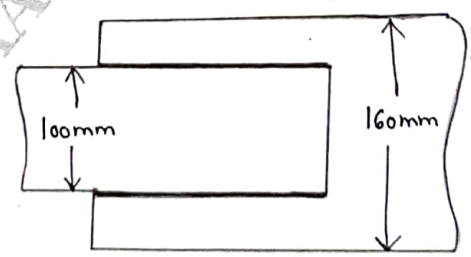
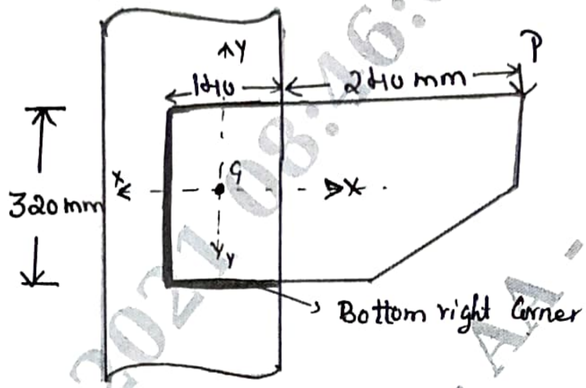


Fig. Q3(b)

4 Determine the maximum load that can be resisted by the bracket shown in Fig. Q4 by fillet weld of size 6mm. If it is shop welding. **(20 Marks)**

Fig. Q4



5 Design a single angle section for a tension member of a roof truss to carry a factored tensile force of 225kN. The member is subjected to the possible reversal of stress due to the action of wind. The effective length of the member is 3m. Use 20mm shop bolts of grade 4.6 for the connections. **(20 Marks)**

6 Design a laced column with 2 channels back to back of length 10m to carry an axial factored load of 1400kN. The Column may be assumed to have restrained in position but not in direction at both ends (hinged ends). **(20 Marks)**

7 Design a slab base for a column ISHB 300@ 577N/m carrying an axial factored load of 1000kN. M_{20} grade concrete is used for the foundation. Provide welded connection between column and base plate. **(20 Marks)**

8 Write short notes on :

a. Advantages and disadvantages of bolted connection.
b. Advantages and disadvantages of steel structures.
c. Types of welded joints.
d. Fire protection for steel structures.

(20 Marks)

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