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09ENG65

Sixth Semester B.Arch. Degree Examination, July/August 2022
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)**

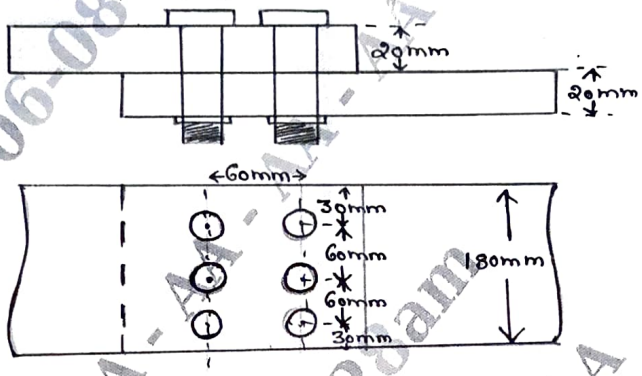


Fig. Q1(b)

2 a. Explain different types of welds with neat sketches. **(08 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.

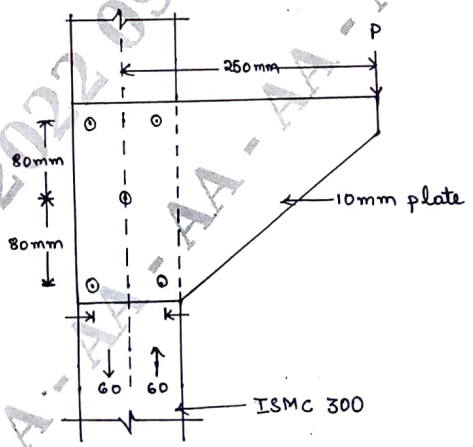


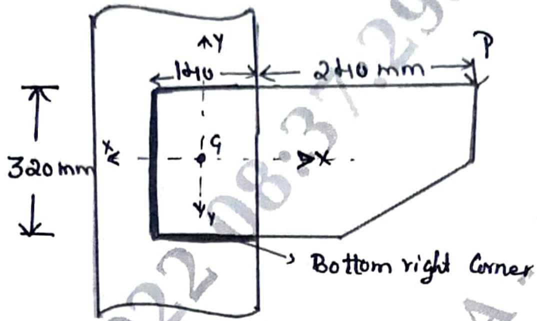
Fig Q2(b) **(12 Marks)**

3 a. What are the defects in welded connections? **(08 Marks)**

b. A 150mm×10mm plate and a 180mm×10mm plate are to be connected in a lap joint by shop weld. Design the connection for the full strength of the 150mm×10mm plate. **(12 Marks)**

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

6 a. List the design steps in lacing system. **(10 Marks)**

b. Determine the design axial load capacity of the column ISHB300@577 N/m if the length of column is 3 and its both ends pinned. **(10 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 Explain the following :

a. Fire protection of steel structures **(05 Marks)**

b. Advantages and disadvantages of bolted connections. **(05 Marks)**

c. Advantages and disadvantages of steel structures. **(10 Marks)**

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