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09ENG6.5

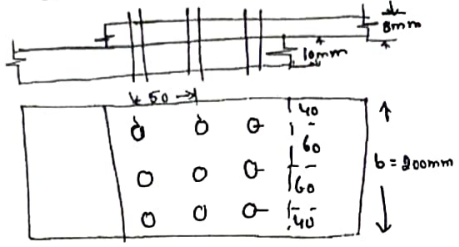
Sixth Semester B.Arch. Degree Examination, Dec.2016/Jan.2017
Structures – VI

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer any FIVE full questions.***
2. ***Use of IS800, steel tables is permitted.***
3. ***Assume any missing data.***

1 a. Determine the efficiency of the lap joint shown in Fig. Q1 (a). Use M16 property class 5.6 bolts. The grade of plate is 410 N/mm^2. (Fig. Q1 (a)) **(14 Marks)**

b. Explain the advantages and disadvantages of bolted connections. **(06 Marks)**



All dimensions in mm

Fig. Q1 (a)

2 a. Determine the bracket load it can carry for the shown connection. Use M20 bolts with property class 4.6 (Fig. Q2 (a)) **(12 Marks)**

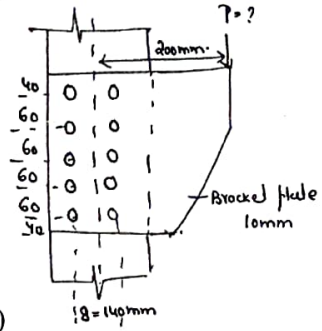


Fig. Q2 (a)

All dimensions in mm

b. Explain the advantages and disadvantages of structural steel. **(08 Marks)**

3 a. The 10 mm thick bracket plate shown in Fig. 3 (a) is connected with the flange of column ISHB 300 @ 577 N/m. Find the size of the weld to transmit a factored load of 250 kN. **(14 Marks)**

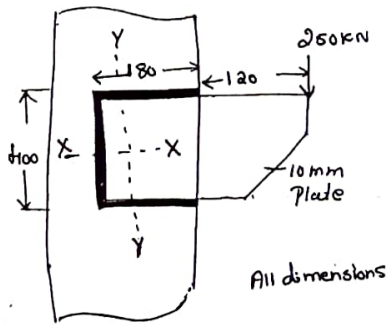


Fig. Q3 (a)

b. Explain the advantages and disadvantages of welded connections. **(06 Marks)**

4 Determine the tensile strength of a roof truss member 21SA, 90×60, 6 mm connected to the gusset plate of 8 mm thickness by 4 mm weld as shown in Fig. Q4 (a). The effective length of weld is 200 mm. Fig.4. **(20 Marks)**

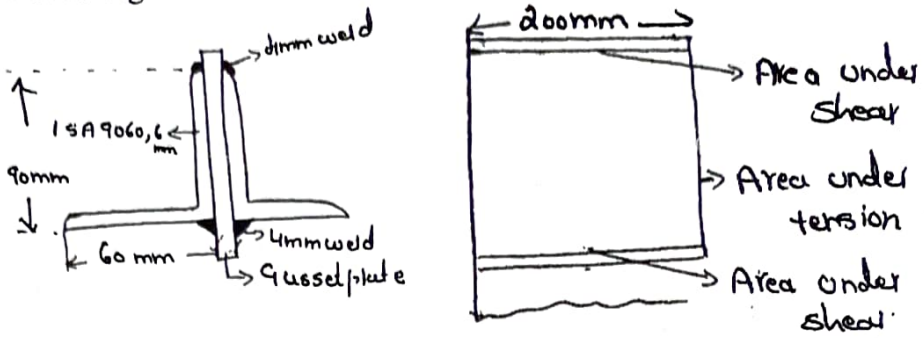


Fig. Q4

5 a. Write the effective length of the columns with different end conditions. **(06 Marks)**

b. Determine the design axial load capacity of the column ISHB 300 @ 577 N/m if the length of column is 3 m and its both ends pinned. **(14 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 the foundations. Provide welded connections between column and base plate. **(20 Marks)**

7 Design a simply supported beam of effective span 1.5 m carrying a factored concentrated load of 360 kN at mid span. **(20 Marks)**

8 Write short notes on:

a. Fire protection of steel structures.

b. Modes of failure of bolts.

c. Lap joints and butt joints.

d. Types of bolts. **(20 Marks)**

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