

Sixth Semester B.Arch. Degree Examination, Dec.2018/Jan.2019
Structures – VI

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions.
2. Use of IS 800-2007 and Steel table.

- 1 a. What are the advantages and disadvantages of using bolted connections? (05 Marks)
- b. Determine the design strength of a 22 mm diameter bolt for the cases given below:
 - (i) Lap joint.
 - (ii) Single cover butt joint with 12 mm cover plots.
 - (iii) Double cover butt joint with 10 mm cover plate. (15 Marks)
- 2 a. Explain the different modes of failures in bolted connection with sketches. (06 Marks)
- b. A bracket is bolted to the flange of a column as shown in Fig. Q2 (b) using 8 mm thick bracket plate using M20 bolts of grade 4.6 design the connection. (14 Marks)

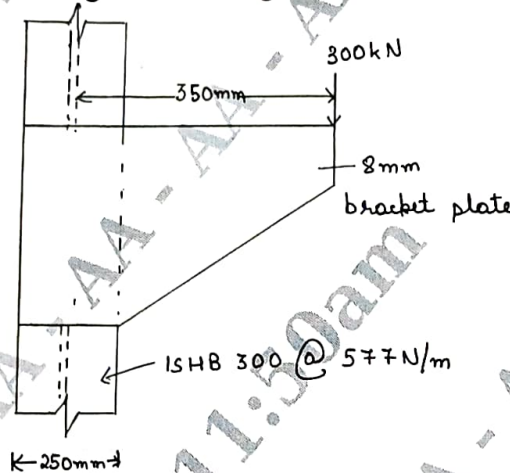
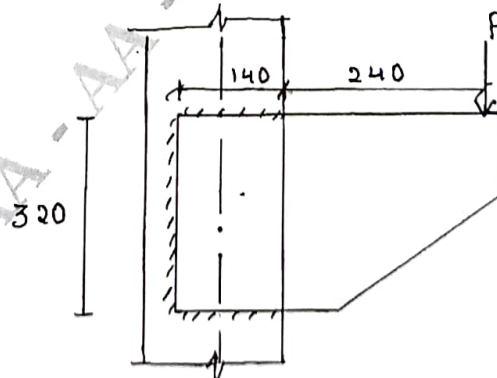


Fig. Q2 (b)

- 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 a. What are the advantages of welded connections over bolted connections? (05 Marks)
- b. Determine the maximum load that can be resisted by the bracket shown in Fig. Q4 (b), by fillet weld of size 6 mm, if it is shop welding. (15 Marks)



All dimensions in mm

Fig. Q4 (b)

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- 5 Design an angle section to carry a factored tensile force of 200 kN. Bolts of 20 mm diameter are to be provided for the connection of the member to the gusset plate. Take $f_y = 250 \text{ N/mm}^2$ and $f_u = 410 \text{ N/mm}^2$. The design strength of a 20 mm diameter bolt is 45.3 kN. (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 A steel column ISHB 400@759.3 N/m is subjected to a factored axial load of 2000 kN. Design a slab base plate for the column. Assume that the bearing surfaces of the column and base plate are machined. The concrete footing is of M20 concrete. (20 Marks)
- 8 Write short note on:
a. Advantages and disadvantages of steel structures.
b. Types of welded joints.
c. Fire protection for steel structures.
d. Limit state method of design. (20 Marks)

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