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09ENG65

Sixth Semester B.Arch. Degree Examination, July/August 2021
Structures - VI

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer any FIVE full questions.***
2. ***Use of IS 800 and SP-6(1) permitted.***
3. ***Assume any missing data suitably.***

1 a. State and explain "Design strength of a Bolt". **(06 Marks)**

b. Two plates of 410 grade and of thickness, 8 mm each are lap jointed using 16 mm dia. bolts of grade 4.6 calculate the design strength of bolt.. **(14 Marks)**

2 Calculate the design load 'P' for the joint shown in Fig.Q2. 18 mm dia grade 4.6 bolts are used.

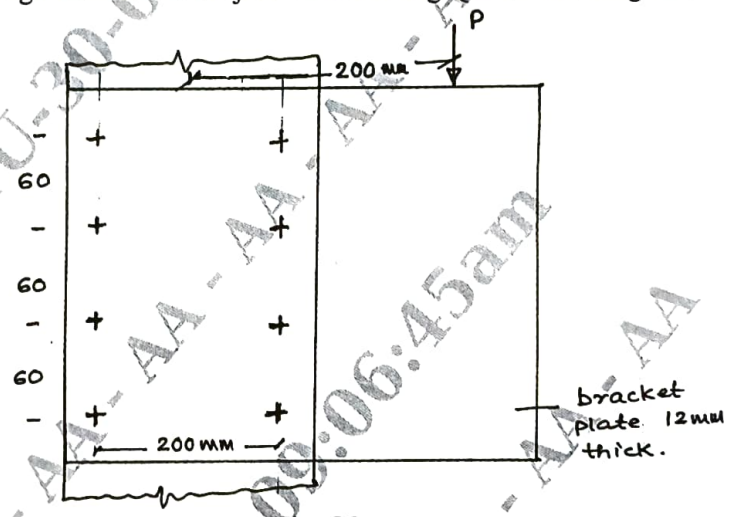

Fig. Q2 **(20 Marks)**

3 Calculate the size of weld required for the joint shown in Fig. Q3.

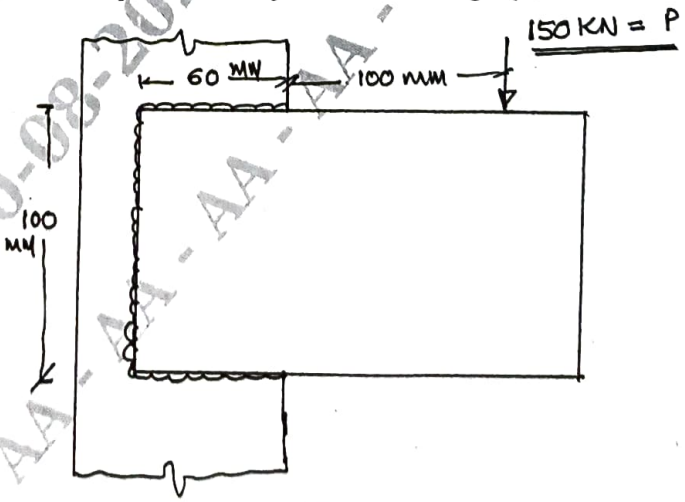

Fig. Q3 **(20 Marks)**

4 Design a single angle section for a tension member of a roof truss to carry a factored tensile force of 225 kN. 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 connection **(20 Marks)**

5 In a truss a strut 3m long consist of two angles ISA 100×100×6mm. Find the factored strength of the member if the angles are connected on both sides of 12mm gusset by

a. One bolt.
b. Two bolts.
c. Welding, which makes the joint rigid. **(20 Marks)**

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

7 Design a beam for a roof of size 7.5m × 12m. Provided 100mm thick RC slab supported on steel beams at 3m apart c/c. Live load and finishing load taken as 4 kN/m^2 and 1 kN/m^2 respectively. Take limiting deflection as span/250. Assume wall thickness, self weight of beam as 250 and 1 kN/m respectively. **(20 Marks)**

8 Write short notes on :

a. Fire protection for steel structures.
b. Defects in welded connection with sketches.
c. Advantages and disadvantages of Bolted connection over welded.
d. Types of Compression and Tension members used with sketches. **(20 Marks)**

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