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09ENG65

Sixth Semester B.Arch. Degree Examination, Feb./Mar. 2022  
**Structures – VI**

Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer any FIVE full questions.****2. Use of IS 800 – 2007 and SP – 6(1) steel table is permitted.****3. Missing data, if any, may be suitably assumed.**

- State and explain “design strength of a bolt”. (06 Marks)
  - 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)
- Calculate the design load ‘P’ for the joint shown in Fig.Q2. 18 mm dia grade 4.6 bolts are used.

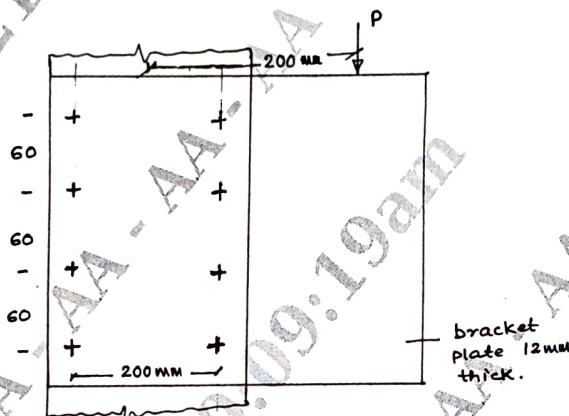


Fig.Q2

(20 Marks)

- What are the advantages and disadvantages of welded connection? (06 Marks)
  - A T-section of size 150×150×10 mm is welded to a column as shown in Fig.Q3(b). Determine the bracket load it can carry. Take size of weld of as 8 mm.

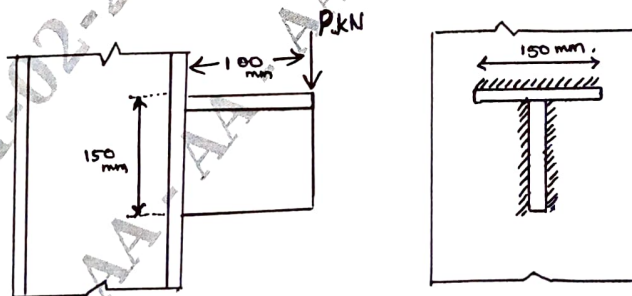


Fig.Q3(b)

(14 Marks)

- Design a tension member using single angle section to carry load of 180 kN. Use HSFG bolts of M20 with property class 8.8. Do the necessary check. (20 Marks)

- 5 Design a column section using double channels back to back to carry a factored load of 2000 kN. The height of the column is 5 m with both the end hinged. Also design a suitable lacing system. (20 Marks)
- 6 Design a slab base for a column ISHB 300@ 577N/m carrying an axial factored load of 1000kN. M<sub>20</sub> concrete is used for the foundation. Provide welded connection between column and base plate. (20 Marks)
- 7 A roof of a hall measuring 8m×12m consists of 100mm thick R.C slab supported on steel I- beams spaced 3m apart as shown in Fig Q7. The finishing load may be taken as 1.5kN/m<sup>2</sup> and Live load as 1.5 kN/m<sup>2</sup>. Design the steel beam.

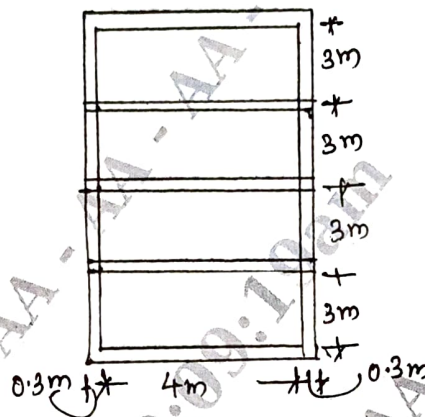


Fig. Q7

(20 Marks)

- 8 a. Explain the design steps involved in lacing system. (10 Marks)
- b. Mention the advantages and disadvantages of bolted connection and explain the following terms with a neat sketch.
- Pitch of bolts
  - Gauge distance
  - End distance
  - Edge distance
  - Staggered distance.

(10 Marks)

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