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10CV72

Seventh Semester B.E. Degree Examination, June/July 2016
Design of Steel Structures

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, selecting at least TWO questions from each part.
2. Use of IS800-2007 and steel tables are allowed.

PART - A

1. a. Explain the Design basis of limit state design. (08 Marks)
 b. List out the difference between limit state of strength and limit state of serviceability. (06 Marks)
 c. Explain the factors which govern the ultimate strength of steel structures. (06 Marks)
2. a. Mention the bolt terminology with a neat sketch of group of bolts. (03 Marks)
 b. Design a bolted connection between the flange of a column ISHB 450@907 N/m and a bracket plate 15 mm thick. The bracket plate is supporting a load of 150 kN at an eccentricity of 350 mm. Adopt HSFG bolts of property class 8.8. (17 Marks)
3. A bracket plate is used to transfer the reaction of beam to a column flange of ISHB 300@618 N/m. A fillet weld of 6 mm is used to connect the plate and column flange as shown in Fig.Q3. Find whether the connection is safe or not. (20 Marks)

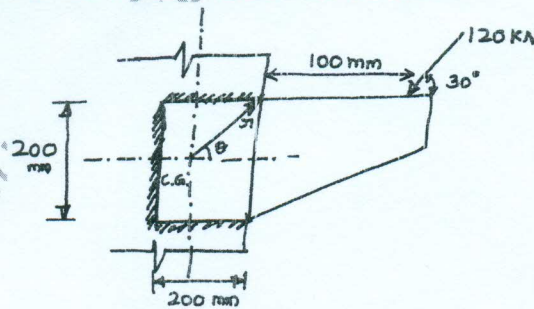


Fig.Q3

4. a. Considering the simply supported beam subjected to gradually increasing concentrated load W , at the center, show that
 - (i) $M_y = 2/3 = M_p$
 - (ii) The hinge length of the plasticity zone is equal to $1/3^{\text{rd}}$ of the span. (06 Marks)
- b. Explain the methods of plastic analysis. (04 Marks)
- c. Determine the plastic and section modulus of a built up section as shown in Fig.Q4(c). (10 Marks)

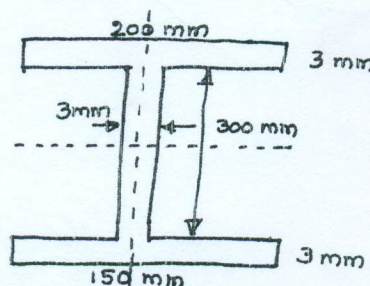


Fig.Q4(c)

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Important Note : 1. On completing your answers, carefully draw diagonal cross lines on the remaining blank spaces.
 2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, w... treated as malpractice.

**PART – B**

- 5 Design the member consists of a single angle to carry a tensile force of 200 kN. The length of tension member is 3.5 m and subjected to reversal stresses due to wind forces. If the yield strength and the ultimate strength of the steel used are 250 MPa and 410 MPa and using 18 mm bolts. (20 Marks)
- 6 Design a laced and battened column with two channels back to back of length 8 m to carry an axial factored load of 1000 kN. The column is hinged at both ends. (20 Marks)
- 7 a. Explain the types of column bases. (04 Marks)
b. Design a slab base for an ISHB 350@661.2 N/m column to carry a factored load of 1000 kN. M₂₅ concrete and Fe 415 grade steel is used for the foundation. (16 Marks)
- 8 a. What are the factors, which affects lateral stability? (03 Marks)
b. Design a cantilever beam which is built in to concrete wall and carrying a load of 25 kN/m and live load of 10 kN/m. The span of beam is 5 m. (17 Marks)
