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Total no. of Questions: 09

Total No. of Pages: 03

B. Tech. (CE) (Sem. 5)
DESIGN OF STEEL STRUCTURES-I
SUBJECT CODE: BTCE-501
PAPER ID: A2078

Time: 03 hours

Maximum Marks: 60

Instructions to Candidates:

1. Section A is compulsory consisting of TEN questions carrying TWO marks each
2. Section B contains FIVE questions carrying FIVE marks each and the students have to attempt any FOUR questions
3. Section C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions
4. Assume missing data, if any.

SECTION A

1.
 - a) List the various types of welds.
 - b) How you can designate bolts?
 - c) What do you mean by lug angles?
 - d) Draw a bending stress diagram under a column base. Which is subjected to a point load P at an eccentricity e.
 - e) What are purlins?
 - f) What are the different types of failures of tension members?
 - g) Explain Grillage Foundation.
 - h) What is the recommended value of effective length of a compression member if it is effectively held in position at both ends, but not restrained against rotation? The unsupported length is 5.

- i) How does the behaviour of compression member differ with its length?
- j) Find rivet value for 20 mm dia power driven rivets which are connecting two plates of thickness 14 and 16 mm by lap joint.

SECTION B

2. A double cover butt joint is used to connect plates 14mm thick. Design the bolted joints and its efficiency.
3. Give in details, various loads considered for the design of roof trusses. .
4. A column section ISHB 350@ 661.2 N/m carries an axial load of 1000 kN and bending moment of 60 kN-m. design a suitable base plate using welded connections.
5. A diagonal member of a roof carries an axial tension of 500 kN. Design the section (Two sections placed back to back are desired).
6. The longer leg of a single angle 90mm x 60mm x 10mm is connected to the gusset plate with 3 bolts of 20 mm dia at a pitch 60mm. This is a tension member of a truss. Determine the block shear strength of the member. Consider end distance as 40 mm.

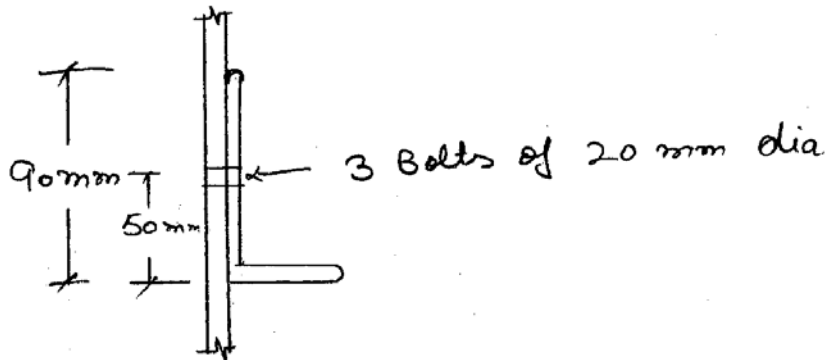


Fig. 1

SECTION C

7. Design a built up column consisting of two channels placed toe to toe. The column carries an axial factored load of 1600 kN. The effective height of column is 8 m. Design the batten system for the column.

8. Design a simply supported beam of 8 m span carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The total u.d.l. is made up of 100 kN dead load including self weight and 150kN live load. In addition, the beam carries a point load at mid span made up of 50 kN dead load and 50kN imposed load. Assume stiff bearing length of 75 mm.

9. The span of knee roof truss used over an industrial building 28 m long is 18m. The spacing of roof trusses is 4 m. The pitch of roof truss is 1 in 4. The galvanized corrugated iron sheets are used for roof covering. The basic wind pressure is 1.5 kN/m^2 and there is no snow fall. The height of eaves above ground level is 8 m. determine the loads at various panel points due to dead load, live load and wind load. Assume normal permeability.