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ET-508(B)

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B.Tech. Civil (Construction Management) / B.Tech. Civil (Water Resources Engineering)

Term-End Examination

June, 2012

ET-508(B) : STRUCTURAL DESIGN-II

Time : 3 Hours *Maximum Marks : 70*

*Note : Attempt **any five** questions. All questions carry **equal** marks. Use of steel tables, IS : 800 (1984) and calculator is permitted. Assume any missing data suitably.*

1. A tension member consists of two 100x75x10 mm IS angles. These angles are connected by their long legs to a gusset plate of 12 mm thickness by means of 18 mm diameter rivets in such a way that each angle section is reduced by one rivet only. Calculate the tensile strength of the member if the angles are connected on the opposite sides the gusset plate and angles are properly tack riveted. **14**

2. A bracket transmits a load of 100 kN at an eccentricity of 250 mm to a column through 10 rivets of 20 mm diameter arranged in two vertical rows as shown in fig 1. The pitch of the rivets is 70 mm and the load lies in the plane of **14**

the rivets. Determine the maximum stress in the rivets.

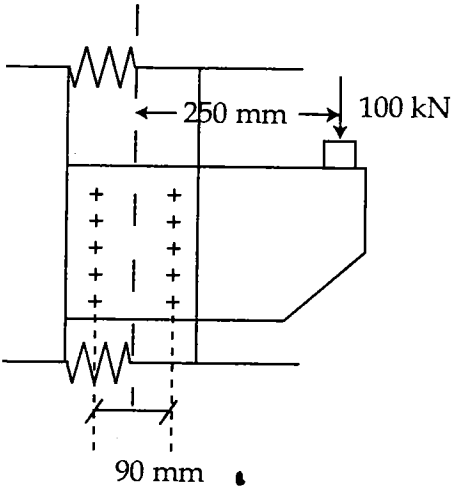

Fig. 1

3. A simply supported beam has a span of 8.0 m. The compression flange of the beam is laterally supported through out its length. Design the beam to carry a uniformly distributed load of 25 kN/m including its self weight. Assume $f_y = 250 N/mm^2$. **14**

4. Design a slab base for a column of ISMB 400 to carry an axial load of 450 kN. The allowable bearing pressure of concrete is 4 MPa. Permissible bending stress in slab base may be taken as 105 MPa. **14**

5. A column has to carry an axial load of 1300 kN. It has a length of 6 m with its bottom end held in position only and the top end held in position and restrained in direction. Design a build up column consisting of two I-sections. Use Fe 250 steel and provide a batten system to connect columns. **14**

6. Design column splices at a section of a column. Ends of the column are milled and faced for the bearing. The column consists of ISHB 350@0.71 kN/m and carries an axial load of 350 kN, shear force of 30 kN and a moment of 20 kN - m. **14**

7. (a) Discuss various forces acting on steel chimneys briefly. **7**
   (b) Describe the design of purlins for a steel truss roof. **7**

8. Write short notes on ***any four*** of the following : **4x3½=14**
   (a) Forces in a gantry girder
   (b) End bearings for steel bridges
   (c) Deck type plate girder railway bridges
   (d) Types of steel chimney
   (e) Types of column base