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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, 2011

ET-508(B) : STRUCTURAL DESIGN-II

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any four** questions. Use of steel table, IS 800 and calculator is allowed. Any missing data may be suitably assumed.*

1. Design a suitable fillet weld to connect a tie bar 60×8mm to a 12mm thick gusset plate. The permissible stresses in the tie bar and fillet weld are 150 MPa and 108 MPa respectively. **17½**

2. A tension member consisting of two $150 \times 115 \times 10$ mm IS angles are connected by their long legs to a gusset plate by means of 18 mm diameter rivets in such a way that each angle section is reduced by one rivet hole only. Determine the tensile strength of the member when the angles are connected on the opposite sides of a 12mm gusset plate and tack riveted. **17½**

3. A column consisting of SC 140 @ 33.3 Kgf/m has an unsupported length of 4 m. It is effectively held **17½**

in position and restrained against rotation at one end and at the other end restrained against rotation but not held in position. Determine the axial load the column can carry if the yield stress of steel is 250N/mm^2. Also from steel tables for SC 140 @ 33.3 Kgf/m a=4.24x10^{3}mm^2, r_x=58.9 mm, r_y=32.1 mm permissible stress can be calculated from the following :

μrmin	130	140	150	160
σac (Mpa)	57	51	45	41

4. A column consisting of ISHB 400 @ 822 N/mm carries an axial load of 400 kN and a moment of 20 kN-m. Design the column splices when the ends of the column are milled and faced for bearing. Take f_y =250 N/mm^2 **17½**

5. A column made up of ISMB 400 section is subjected to an axial load of 480 kN and a bending moment of 60 kNm at its base. Design the slab base for the column on M15 concrete. **17½**

6. (a) Briefly explain merits and demerits of welding in comparison to riveting. **7**

   (b) Explain the procedure of design of purlins for a steel roof truss. **10½**