01671

B.Tech. Civil (Construction Management) / B.Tech. Civil (Water Resources Engineering)
Term-End Examination
December, 2012

ET-508(B) : STRUCTURAL DESIGN–II

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt **any four** questions. All questions carry equal marks. Use of steel tables, IS : 800 and calculator is allowed. Assume any missing data suitably.*

1. Determine the rivet value of a 20 mm diameter **17½** rivets connecting 10 mm plate and is in :
   (a) Single shear
   (b) Double shear
   The permissible stresses for rivets in shear and bearing are 80 MPa and 250 MPa respectively and for plate in bearing is 250 MPa.

2. Calculate the strength of a ISA 40 × 25, 6 mm thick **17½** when used as a tension member with its longer leg connected by 14 mm diameter rivets.

3. Design a column section to carry an axial load of **17½** 410 kN. The column is 4.2 m long and is effectively held in position at both ends but restrained against rotation at one end only. Yield stress of steel = 250 MPa (Take permissible compressive stress = 80 MPa)

4. A simply supported beam of span 8 m is carrying **17½** a uniformly distributed load of 45 kN/m. Design a beam using standard I sections, if the compression flange of beam is laterally supported throughout its length.

5. A column consisting of ISHB 400 @ 822 N/mm **17½** 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 $fy = 250$ N | mm^2)

6. Design a purlin to span 5.0 m between trusses. **17½** The purlins are spaced 1.5 m apart. The roofing and insulation weight 20 kg | m^2 and the snow load is 100 kg | m^2. Use $P_b = 1420$ kg/cm^2.

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