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ET-508(B)

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

Term-End Examination

December, 2013

ET-508(B) : STRUCTURAL DESIGN–II

01491

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. A welded bracket transmits a vertical load of 125 kN at a distance of 350 mm. The column flange is connected to a 12 mm thick plate by horizontal and vertical welds (Fig 1). Calculate the size of fillet weld if allowable stress in the weld is 108 N/mm^2. **17½**

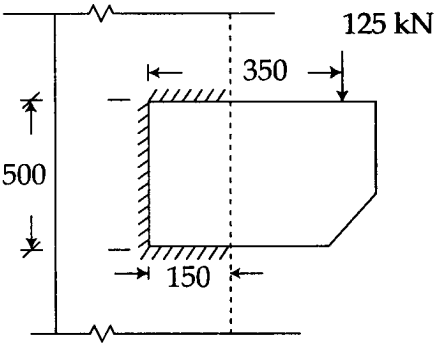

Fig. 1

(All dimensions are in mm)

2. Design a compression member consisting of double angles, placed back to back. This member is connected to the same side of a gusset plate of 12 mm thickness. The member is carrying a load of 300 kN and has an effective length of 3.0 m. Use Fe 250 steel. **17½**

3. Design a suitable gusseted base for a column consisting of one ISHB 250 and two plates 300mm x 12mm, one on each side. The column carries an axial load of 1300 kN. Assume the permissible stress in concrete as 3000 kN/m^2 and permissible bearing capacity of soil as 180kN/m^2. **17½**

4. (a) Explain the procedure of design of purlins for a steel roof truss. **7½**

   (b) Derive the relation to evaluate horizontal pressure on vertical wall of a silo using Janseen's theory. **10**

5. The central section of a simply supported plate girder consists of a web plate 1800mm × 8mm, two flange plates 500mm × 10mm and two angles IS A 200 × 150 × 10mm in each flange. The effective span of girder is 8.0m. Calculate safe uniformly distributed load the plate girder can carry including its self weight. The compression flange of the plate girder is laterally supported. Use power drive shop rivets of 20 mm dia for the connections. **17½**

6. Design a beam having 6.0 m effective span and carrying a uniformly distributed load of 35 kN/m (including self weight) over its length. The compression flange is laterally supported through out. Also check the beam for shear and deflection. Assume $f_y = 250$ N/mm^2. **17½**