

00571

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

**Term-End Examination
June, 2010**

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 table, IS 800-1984 and calculator is allowed. Assume any missing data suitably.

1. A flat tie bar, used as a bridge truss diagonal, carries an axial pull of 600 kN. This diagonal is connected to a gusset plate of 20 mm thickness by a double cover butt joint with 20 mm dia field rivets. Determine the thickness of flat tie bar if the width of the flat is 250 mm. Design an economical joint and determine the efficiency of the joint also. 14

2. In a roof truss a double angle tie, ISA 125 × 95 × 10 mm placed short log back to back, is connected to the same side of gusset with 22 mm dia rivets. Compute the tensile strength of the members. What is the percentage increase on tensile strength of member if the angles are connected to each side of the gusset plate ? Assume that angles are properly tacked together. 14

3. A simply supported beam has an effective span of 6m. It carries a uniformly distributed load of 30 kN/m over its span length and a concentrated load of 20 kN at mid span . The compression flange is laterally supported throughout its length. Design this beam using steel of grade Fe 250. 14

4. A column effectively restrained in position as well as direction at both ends carries an axial load of 1600 kN. Design a compound column using lacing if the length of the column is 5.50 m. Assume a yield stress of 250 N/mm². 14

5. (a) Describe how different types of loads are considered in the design of roof trusses. Explain in detail with the help of sketches. 10
 (b) Write assumptions in the theory of riveted connections. 4

6. A plate girder is simply supported at the two ends and has an effective span of 20 m. Design the central section for total live load of 2200 kN. Assume that plate girder is riveted. 14

7. A column section ISHB 350 @ 67.4 kg/m carries an axial load of 1150 kN. Design a suitable gusset base. The column is faced for complete bearing. Allowable bearing pressure on concrete is 4000 kN/m². 14

8. Design the raft foundation of a self supported steel chimney. The chimney is 50m high and has a diameter of 3m at the top. Assume horizontal pressure to be # 1.5 kN/m² and bearing capacity of concrete as 4 N/mm². 14