ET-508(B)

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

Term-End Examination

June, 2015

00175

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 scientific calculator is allowed. Assume any
missing data suitably.

1. A tie member has to transmit a pull of 300 kN.
    Design a butt joint to connect it with 12 mm thick
    plate. Also find the efficiency of the joint. Assume
    steel of yield stress 250 MPa.   *14*

2. Design a single angle discontinuous strut to carry
    a load of 47 kN. The length of the strut is 3·0 m
    between intersections. The strut is connected to
    12 mm thick gusset plate with (a) 24 mm diameter
    power driven rivet(s), (b) 20 mm diameter hand
    driven rivets.   *14*

3. Design a suitable gusset base for a column section ISHB 350 @ 674 N/m carrying an axial load of 1100 kN. Allowable bearing pressure on concrete is 4000 kN/m². *14*

4. A tension member 10 m long is subjected to an axial tensile load of 1200 kN. Design the section with channels facing each other. The rolled section available is ISMC 300 @ 358 N/m only. The channel sections are weakened by one rivet hole on each flange. Check the adequacy of the section and provide the plates, if required. *14*

5. Design a beam of 5 m effective span carrying a uniform load of 20 kN/m, if the compression flange is laterally unsupported. Assume $f_y = 250$ N/mm². *14*

6. An ISMB 500 @ 869 N/m transmits an end reaction of 200 kN and a bending moment of 110 kNm to the flange of a column ISHB 300 @ 588 N/m. Design a welded connection. *14*

7. Briefly discuss how wind force is considered in the design of trussed roofs. Show the various components of such a roof with the help of a neat sketch. *14*

8. Write short notes on any *two* of the following topics : *2×7=14*

(a) Calculation of earthquake forces in moment resisting frames

(b) Comparison of stress-strain diagrams of mild steel and medium tensile steel

(c) Advantages of steel construction

(d) Types of welds

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