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ET-508(B)

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

Term-End Examination

00645

June, 2017

ET-508(B) : STRUCTURAL DESIGN – II

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any* ***four*** *questions. Use of steel table, IS : 800 and scientific calculator is allowed.*

1. A tie member 75 mm × 8 mm is to transmit a load of 90 kN. Design the fillet weld and calculate the necessary overlap. The fillet weld is applied on three sides AB, BC and CD as shown in Figure 1. $17\frac{1}{2}$

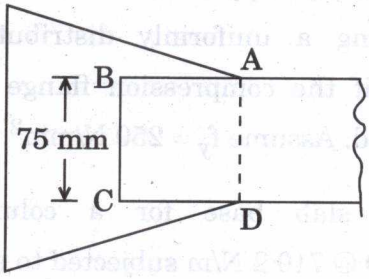

Figure 1

2. Determine the tensile strength of a roof truss diagonal 100 × 75 × 10 mm (f_y = 250 N/mm^2) connected to the gusset plate as shown in Figure 2 by 20 mm diameter power driven rivets in one row along the length of the member. The short leg of the angle is kept outstanding. $17\frac{1}{2}$

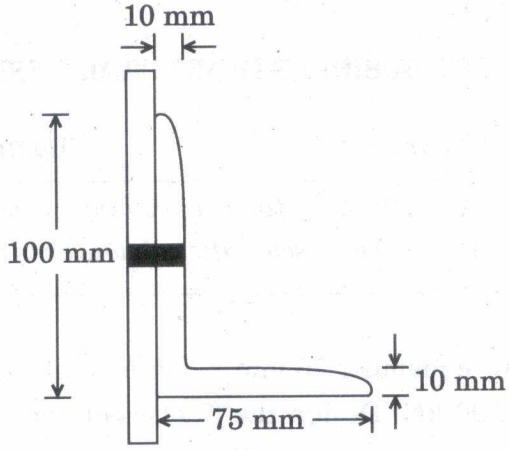

Figure 2

3. Design a simply supported beam of effective span 5 m carrying a uniformly distributed load of 20 kN/m, if the compression flange is laterally unsupported. Assume f_y = 250 N/mm^2. $17\frac{1}{2}$

4. Design a slab base for a column section I.S.H.B 350 @ 710·2 N/m subjected to an axial load of 1030 kN. The load is transferred to the base plate by direct bearing of the column flanges. $17\frac{1}{2}$

5. Design an angle section purlin for a trussed roof from the following data : $17\frac{1}{2}$

Span of roof truss = 12 m

Spacing of roof truss = 5 m

Spacing of purlins along the slope of roof = 1·2 m

Slope of roof truss = 1 Ver. to 2 Hor.

Wind load on roof surface normal to roof = 1·04 kN/m^2

Vertical load from roof sheeting = 0·2 kN/m^2

6. (a) What do you mean by bunker ? Explain the various components of a bunker. $7\frac{1}{2}$

(b) Using Airy's theory, show that the maximum depth of a bunker can be expressed as

$$h_{max} = b\left[\mu + \sqrt{\frac{\mu\,(1+\mu^2)}{\mu+\mu'}}\right]$$

where all the terms have their usual meanings. *7+3=10*
