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ET-508(B)

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

Term-End Examination

June, 2018

00373

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. (a) A bridge truss tie bar flat carries an axial pull of 515 kN. It is to be connected to a gusset plate, 20 mm thick, by a double cover butt joint with 22 mm diameter rivets. If the width of the flat tie bar is 250 mm, determine required thickness of the flat bar. Design an economical joint. Determine the efficiency of the joint. (f_y = 260 N/mm^2) *10*

(b) Discuss briefly the various design aspects for a crane girder. $7\frac{1}{2}$

2. Design a roof truss tie member made up of a single angle connected to a 10 mm gusset plate and carrying a load of 200 kN. Take separately the following two conditions of joint connections :

   (a) Using a single row of power driven rivets

   (b) Using 5 mm fillet welds $17\frac{1}{2}$

3. (a) Design a double angle (placed back-to-back) discontinuous strut to carry a compressive load of 100 kN. The length of strut is 3 m between intersections. 10

   (b) Describe various types of loads considered for design of a railway bridge. $7\frac{1}{2}$

4. (a) What do you understand by elastic instability of flanges and webs in beams ? Discuss briefly. 10

   (b) What are grillage bases ? Where are they used ? Describe briefly. $7\frac{1}{2}$

5. A column of section ISHB 300 @ 630 N/m carrying an axial load of 600 kN is supported over another column of section ISHB 400 @ 822 N/m. Design the splicing at the joint. The ends are milled for full bearing. Take f_y as 250 N/mm^2. $17\frac{1}{2}$

6. (a) Design a purlin to span 5 m between trusses. The purlins are spaced 1·5 m apart. The roofing and insulation weigh 20 kg/m^2 and snow load is 100 kg/m^2.

Use P_b = 1420 kg/cm^2. *10*

(b) Write a short note on 'Lug angles'. $7\frac{1}{2}$
