BICE-013

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

June, 2018

00583

BICE-013 : STRUCTURAL DESIGN AND DRAWING – I

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt any **five** questions. Use of IS 456 and IS 800 codes is allowed. Use of scientific calculator is allowed.*

1. (a) Describe the limit state method of design of RRC structures.   5

    (b) Determine the limiting moment carrying capacity of RC rectangular section of size 250 × 550 mm deep (effective) reinforced on the tension side with 4 numbers 20 mm ϕ bars. Use M 20 and Fe 250 grade of concrete and steel respectively.   9

2. (a) Describe with neat sketches the detailing of one-way and two-way slabs.   9

    (b) Discuss different types of loads that are considered for the design of a roof truss.   5

3. (a) Discuss isolated and combined footing. *4*

(b) Design a column to carry an axial service load of 1225 kN. Use M 25 and Fe 415. The effective length of the column is 3·25 m. *10*

4. (a) Describe different types of rivets. *4*

(b) The web of a plate girder consists of a 800×12 mm plate of grade Fe 410 and is to be provided with a splice at a section where factored shear and bending moment to be resisted by the web are V = 700 kN and M = 200 kNm respectively. The flange plate thickness is 40 mm each. Design a web splice. *10*
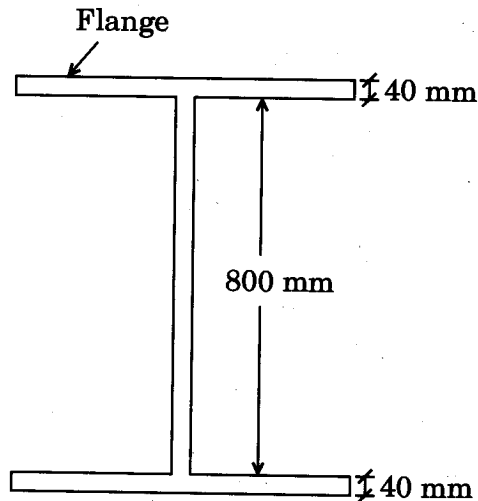
Flange

40 mm

800 mm

40 mm

Figure 1

5. **(a)** Discuss the types of tension members. What are the differences between single angle members and double angle members ?   *5*

   (b) A fabricated column section, as shown in Figure 2, is 5 m long with both ends fixed. Check the adequacy of the section with the factored load on the column = 2750 kN. Take f_y = 250 MPa.   *9*
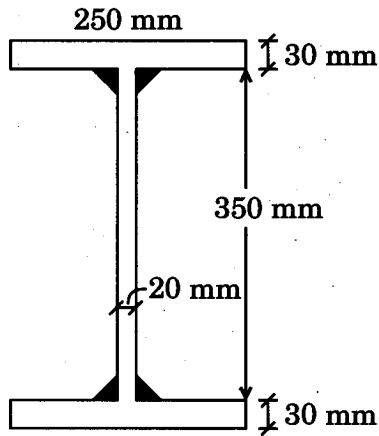

250 mm
30 mm
350 mm
20 mm
30 mm

Figure 2

6. **(a)** Discuss the different types of trusses.   *4*

   (b) The section of a welded plate girder consists of flange plate 600 × 40 mm and web plate 1800 × 12 mm. Determine the moment capacity of the section and the shear resistance corresponding to web buckling. Intermediate stiffeners are not provided.   *10*

7. Write short notes on any *four* of the following : $4 \times 3\frac{1}{2} = 14$

   (a) Types of Loads on Residential Buildings

   (b) Types of Compression Members

   (c) Grillage Foundation

   (d) Lug Angles

   (e) Stress-Strain Curve of Mild Steel

   (f) Development Length

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