M.Tech. 1st Semester (Civil Engg.)

Examination, December–2018

SPECLISATION IN STRUCTUAL DESIGN

Paper– MTSD–104

Design of Structures-I

Time allowed : 3 hours] *[Maximum marks : 100*

Note: *Attempt any **five** questions. Assume any data if missing.*

1. Explain different type of loads used in the design of steel structure and also draw the stress strain curve for mild steel. Why steel member is preferred safe in comparison to others as a structural member. 20

2. Design a column of effective length 7 mm it is subjected to an axial load of 2000kN provide two channels back to back connected with battens by welded connection assuming fy = 250 MPa. 20

3. Design a beam of 5m effective span carrying a uniform load of 30 kN/m if the compression flange is laterally unsupported. Assuming fy = 250 N/ mm^2. 20

4. Design a tubular purlin section for the following data:

Spacing of the roof truss c/c	5 m
Dead load of roofing	0.5 kN/m
Live load on purlin	1.1 kN/m
Wind load on purlin	–1.5 kN/m

20

5. Explain all different types of welded connections along with neat and clean diagram. Also explain the advantages of welded connections over bolted connections. 20

6. Explain the followings in detail 20
   (i) Types of tension members
   (ii) High strength steel cables
   (iii) Tension splice

7. (a) What are the difference between short column and long column, also write down IS 456 : 2000 specifications for the design of column.
   (b) A circular column 5.6 m height is effectively held in position at both ends and restrained against rotation at one end. Design the column, to carry an axial load of 1500kN, if its dia is restricted to 400 mm. Use M 25 mix and Fe 500 steel. 20

8. Design a R.C. slab for a room measuring 4.5m × 5.5m from inside. The slab carries a live load of 2000 N/m^2 and is finished with 25 mm thick granolithic topping. Use M 24 concrete and Fe 500 steel. The slab is simply supported at all the four edges, with corners free to lift. 20