M.Tech 1st Semester (Civil Engg.) (Specialisation in Structural Design) Examination, December–2017

DESIGN OF STRUCTURES-I

Paper-MTSD-104

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

Note : *Attempt any **five** questions.*

1. Explain and draw stress-strain curve of mild steel in detail and also explain the design specification as per IS 800:2007. 20

2. Design a beam of 6m effective span carrying a uniform load of 35kN/m if the compression flange is laterally unsupported. Assuming fy=250N/mm^2. 20

3. Design a roof truss of following data : 20
   Location = Kolkata
   Life span = 50 years
   Permeability = Normal
   Spacing = 3.5m
   Span of Truss = 18 m
   Central rise = 3.75m
   Height of truss at eaves level = 10 m
   Fy = 250 Mpa
   Corrugated GI sheet (self wt. 131 N/m^2)
   Spacing of purlin limited to 1.3 m

4. Design a suitable base and anchor bolts for column subjected to an axial load of 650 KN and a wind moment at 200KNm. The column section ISHB 450@925N/m. The safe bearing pressure at concrete may be assumed to be 6500KN/m^2. 20

5. Explain the difference between welded and bolted connections. Which type of connections are preferred at site and why ? 20

6. (a) Explain all types of footings with neat and clear sketch and also write down IS code recommendations for design of footing.

   (b) Design a rectangular isolated footing of uniform thickness for R.C. column bearing a vertical load of 1500kN and having a base size of 550 × 750 mm. The safe bearing capacity of the soil may be taken as 150kN/m^2. Use M20 concrete & Fe415 steel. 10+10

7. Design a R.C. slab for a room measuring 4m × 5m from inside. The slab carries a live load of 2500 N/m^2 and is finished with 22 mm thick granolithic topping. Use M 20 concrete and Fe 415 Steel. The slab is simply supported at all the four edges, with corners free to lift. 20

8. Explain all types of footings with neat and clear sketch and also write down IS code recommendations for design of footing. 20