B.E/B.Tech (Full Time) DEGREE END SEMESTER ARREAR EXAMINATIONS, APRIL / MAY 2014

CIVIL ENGINEERING

Fifth Semester

CE 9302 Design of Steel Structures

(Regulation 2008)

Time: 3 Hours   Answer ALL Questions   Max. Marks 100

Instructions: 1. Use of IS 800-2007, IS 883-1994 and steel tables is permitted.

2. Relevant data may be suitably assumed if found necessary.

PART-A (10 x 2 = 20 Marks)

1. State the advantages of light gauge steel sections.

2. With a neat sketch show a typical double bolted double cover butt joint.

3. What are lug angles?

4. What do you understand by shear lag?

5. Where are slab base connections used?

6. Write the significance of column buckling curves.

7. Define web buckling.

8. What is plastic section modulus?

9. What are the advantages of laminated timber?

10. With neat sketches show any two typical structural joints in timber.

Part – B (5 x 16 = 80 marks)
(Use structural steel of Fe410 grade unless specified otherwise)

11. A plate 200mm x 12mm is used as a tension member connected to a 16mm gusset plate at ends with 6 nos. of 16mm diameter bolts to transfer tension. The bolts are arranged in a single row along the CG of the plate. Pitch = 50mm and end distance = 30mm. Determine the design axial tension.

12. a) Design a single cover butt joint between two plates each of width 200mm, if the thickness of one plate is 16mm and the other 12mm. The joint has to transfer a design load of 250kN. Use bearing type bolts of grade 4.6.Use 10mm thick cover plates.

b) Design a welded connection to connect two angles ISA 75 x 75 x 8mm on either side of a 10mm thick gusset plate to transfer a factored pull of 250 kN . Assume shop welding.

13. a) Determine the load carrying capacity of a built-up column section made of ISMB400 with flange plates of size 250 x 20mm. The effective length of the column is 6m.

(OR)

b) Design a steel stanchion of effective length 5m to carry a factored load of 500 kN.

14. a) Design a laterally restrained simply supported beam of span 6m. It carries a dead load udl of 15 kN/m and a live load udl of 25 kN/m. Design an appropriate section.

(OR)

b) (i) Write the steps involved in the design of plate girder. (8)

(ii) Find the plastic moment capacity of the welded I-girder with flange dimensions : 150 x 10mm and web dimensions: 200 x 12mm (8)

15. a) Design a timber beam using dhaman wood to carry a udl of intensity 18 kN/m inclusive of self weight of the beam. The beam is simply supported at both ends. The clear span of the beam is 5m.

(OR)

b) Design a built-up timber column to carry an axial load of 1200 kN inclusive of self weight. The effective length of the column is 4m. Use Sal wood.