Roll No. | | | | | | | | |

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2012

CIVIL ENGINEERING

Fifth Semester

CE 9302 Design of Steel Structures

(Regulation 2008)

13

Instructions : 1. Use of IS800-2007, IS 883-1994 and Steel Tables is permitted.

2. Suitable data can be assumed if found necessary.

Time : 3 Hours **Answer ALL Questions** **Max. Marks 100**

PART-A (10 x 2 = 20 Marks)

1. With a neat sketch show any two commonly used cold-formed steel sections.
2. List the disadvantages of riveted connections.
3. Define net area of a section.
4. Draw a typical single bolted double cover butt joint.
5. What are the design requirements for pocketed bases?
6. Classify the section ISA 75 x 50 x 6mm
7. Find the plastic moment capacity of ISLC 400. Take f_y = 250 MPa.
8. What are longitudinal stiffeners?
9. State the advantages of timber construction.
10. List the common defects in timber.

Part – B (5 x 16 = 80 marks)

11. Determine the tensile strength of a tie member ISA 75 x 75 x 6 mm connected to a 8mm thick gusset plate using a single row of 5 nos. of 12mm diameter bolts. Take f_y = 250 MPa, f_u = 410 MPa.

12. a) A single bolted lap joint is used to connect two 10mm thick plates. If 16mm diameter 4.6 grade bolts are used at 60mm c/c, determine the strength of the joint and find the efficiency of the joint. Use steel of grade Fe410 with f_y = 250 MPa.

OR

b) Design a fillet weld for the angle section ISA 100 mm X 100mm X 8 mm to carry a factored tension of 400 kN. The angle is connected to a gusset plate 10 mm thick. Design the welded joint if the weld is to be provided

(i) on three sides of the angle

(ii) on the toe and heel of the angle.

Assume shop welding and use plates of grade Fe 410 with f_y = 250 MPa.

13. a) Design a laced column 8m long to carry a factored axial load of 1200 kN. The column is restrained in position and rotation at both the ends. Provide single lacing system with bolted connection. Design the column with two channels placed back to back. Use steel of grade Fe410 with f_y = 250 MPa.

OR

b) (i) Write the steps involved in the design of a column slab base connection (6)

(ii) Design a column to support a factored axial load of 1000 kN. The column has an effective length of 8m with respect to the z-axis and 5m with respect to the y-axis. Use steel of grade Fe410 with f_y = 250 MPa. (10)

14. a) Design a simply supported beam of effective span 6m to carry a factored udl of 40 kN/m. The beam is laterally supported. Assume a bearing length of 80mm. Use steel of grade Fe410 with f_y = 250 MPa.

OR

b) Design an unstiffened plate girder of effective span 30m to carry a factored udl of 40 kN/m. Assume a bearing length of 100mm. Use steel of grade Fe410 with f_y = 250 MPa.

15. a) Design a timber roof beam of clear span 3 m at spacing of 600 mm. The bearing at each end is 100mm. The dead load of roof coverings is 3 kN/m^2 and the live load is 4 kN/m^2. Use teak wood.

OR

b) Design a 6m long rectangular box column built-up using 50 mm thick Sal wood planks to carry an axial load of 500 kN.
