Model Question Paper

Seventh Semester B. Tech Degree Examination

2013 Scheme

13.701 DESIGN OF STEEL STRUCTURES (C)

Time: Three Hours **Maximum marks: 100**

(Use of IS: 800-2007, IS:811-1987, IS:801- 1975 & Steel table permitted)

(Assume suitable data if not given)

PART – A

(Answer all questions, 5 x 4= 20 marks)

1. Sketch and explain various failure patterns of bolted connections.
2. State the difference between laterally unsupported and supported beams. State the design approaches for these two cases.
3. Explain Lattice columns with neat sketch.
4. Explain a. Effective design width, b. Buckling of thin elements encountered in light gauge steel structures
5. State and explain theorems in plastic analysis.

PART – B

(Answer any one question from each module . Each full question carries 20 marks)

Module I

6. a In a truss, a strut 3.2 m long consists of two angles ISA 90 mm x 90 mm x6 mm. Find the strength of the member if the angles are connected on both sides of 12 mm gusset plate by two bolts.

6. b Design a single bolted cover joint butt joint to connect boiler plates of thickness 12 mm for maximum efficiency. Use M20 bolts of grade 4.6. Boiler plates are of Fe 410 grade. Find the efficiency of joint.

OR

7. Design a bridge truss diagonal subjected to a tensile load of 500 kN. Length of diagonal is 4 m. The tension member is connected to a gusset plate 16 mm thick. Use steel of f_y -250 N/mm^2. Design no-slip bolted connections using 20 mm diameter and grade 8.8. The member is subjected to reversal of stress.

Module II

8. Design a laterally unsupported beam for an effective span of 5m, subjected to uniformly distributed service load of 10 kN/m inclusive of self-weight. Use steel of grade Fe 410. Provide all necessary checks.

OR

9. Design the mid span section of a welded plate girder for span 25m, carrying a udl of 120 kN/m for the entire length including self-weight. Also design the intermediate stiffeners provided for the plate girder.

Module III

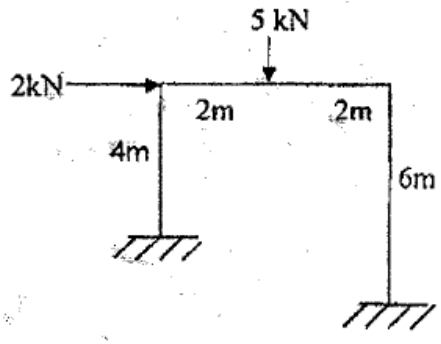
10. Design a built up column 9 m long to carry a factored load of 1200 kN. The column is restrained in position but not in direction at both ends. Design the built-up section as two channels placed back to back. Use steel of grade Fe 410. Provide double lacing and bolts of grade 4.6, 16mm diameter.

OR

11. Design the section of steel column and suitable base for an axial compressive factored force of 500 kN. The effective length of the column is 3.5 m. The concrete used for making the pedestal is of M-20 grade.

Module IV

12. Find the collapse load of given portal frame. Mp is uniform throughout.



OR

13. Design a laterally supported beam using two channels placed back to back for a udl of 5 kN/m. The effective span of beam is 4m. Given Fy of steel – 2400 kg/cm^2.