STEEL STRUCTURES

Course code	Course title	No. Of period/week	Total no. Of periods	Marks for Formative Assessment	Marks for Summative Assessment
C-501	Steel Structures	04	60	20	80

MODEL PAPER
UNIT TEST-I

STEEL STRUCTURES, C-501 C-23

Time: 90 Minutes **Maximum Marks: 40**

PART- A **16 Marks**

Instructions:
(i) Answer all questions
(ii) First question carries FOUR marks, each question of remaining carries THREE marks.

1. (a) Unit mass of steel is …… (CO1)

(b) Minimum size of fillet weld is based on thickness of thinner part (True/False) (CO2)

(c) Length of end return should not be less than……times size of weld (CO2)

(d) Tension member also known as …….. (CO3)

2. Define (a) Permanent Action (b) Variable Action (c) Accidental Action (CO1)

3. Sketch a fillet weld and name various parts. (CO2)

4. Define (a) Size of fillet weld (b) Throat thickness of fillet weld (CO2)

5. Differentiate Net Area and Net Effective Area (CO3)

PART- B **3 x 8 = 24 Marks**

6. (A) An angle ISA 130X130X10mm carrying an axial load of 220kN is connected to a gusset plate 12mm thick. Design the welded connection with side and end welds if ultimate shear stress in weld is 410MPa, connections are made in shop. (CO2)

(OR)

(B) A tie member of a roof truss consists of 2 ISA 100mmx65mmX8mm.The angle are connected to either side of a 10 mm gusset plate and the member is subjected to a working load of 280kN.Design the side fillet weld only. Assume connections are made in the workshop. Take fu =410N/mm2 (CO2)

7. (A) Design a single angle tension member to carry a tensile force of 250kN.The angle is to be connected to a gusset plate with longer leg by fillet welds. Take fy =250N/mm2
fu =410N/mm2. Assume length of the connection as 150mm. (CO3)

(OR)

(B) Determine the design strength of a tensile member ISA 150mmX75mmX10mm when its longer leg is connected to 10mm gusset plate by 7mm fillet welds. The effective length of the weld is 170mm. Take fy =250MPa & fu =410 MPa. (CO3)

8 (A) Determine the design strength of a tensile member ISA 125mmX75mmX8mm when its shorter leg is connected to 10mm gusset plate by 7mm fillet welds. The length of the weld is 180mm. Take fy =250MPa & fu =410 MPa. (CO3)

(OR)

(B) Write the design specifications for fillet weld as per IS 800-2007 (CO2)

MODEL PAPER
UNIT TEST-II
STEEL STRUCTURES, C-501 **C-23**

Time: 90 Minutes **Maximum Marks: 40**

PART- A **16 Marks**

Instructions:
(i) Answer all questions
(ii) First question carries FOUR marks, each question of remaining carries THREE marks.

1. (a) Compression member in a truss is called ……. (CO4)

(b) In plate girder, flange plate is designed to resists…… (CO5)

(c) The value of shape factor for circular section is …… (CO5)

(d) The top chord member of a roof truss is called ……. (CO5)

2. Write any three codal provisions of batten system as per IS: 800-2007 (CO4)

3. Define (a) shape factor (b) plastic moment of resistance (CO5)

4. State the situations where plate girders are necessary (CO5)

5. Determine the live load on truss if angle of slope of roof is 250 (CO5)

PART-B **3X8 = 24Marks**

6. (A) Design a slab base for a column ISHB 300 @ 577 N/m carrying an axial load of 1000kN.Also design the concrete pedestal if the SBC of soil is 190kN/m3.M20 concrete is used for foundation. Yield stress of steel is 250 M Pa. (CO4)

(OR)

(B) Write the design specifications for lacing as per IS: 800-2007 (CO4)

7. (A) Design a steel column section to carry an axial load of 410kN.The column is 4.2m long and restrained against translation and free against rotation. Yield stress of steel is 250 M Pa. (CO4)

(OR)

Design a single angle section to carry a compression of 100kN. The c/c distance between end connections is 2m. Assume that the end connection is done by the fillet welds. The grade of steel is E-250. (CO4)

8. (A) Determine the shape factor of a symmetrical I-section with flange dimensions 140mmX16mm and web dimensions 8.9mm x 368mm. (CO5)

(OR)

(B) A simply supported beam ISLB 300 @370N/m has an effective span of 5 m.
Find the (i) design bending strength of beam (ii) design shear strength of beam. Assume Fe 250 grade steel. The beam is laterally supported. (CO5)

MODEL PAPER DIPLOMA EXAMINATION, (C–23)
DCE—FIFTHSEMESTER EXAMINATION
STEELSTRUCTURES (C-501)

Time:3 hours] [TotalMarks:80

PART—A 3×10=30Marks

Instructions:
(1)Answer all questions. Each question carries three marks
(2)Answers should be brief and shall not exceed five simple sentences
(3) Use of IS: 800-2007 and steel tables are permitted

1. List the mechanical properties of structural steel. (CO1)
2. Define the following terms: (CO2)

   (a)Size of fillet weld (b)Throat thickness o f fillet weld
3. What shall be the maximum size of the fillet weld applied to the (CO2)

   ii) square edge of a plate, and(b) round edge of a flange
4. Write any three applications of tension members. (CO3)
5. Define the following terms: (CO4)

   iii)Least radius of gyration and (b) Slenderness ratio
6. Write any three codal provisions to be followed in the design of lacing system as per IS: 800-2007 (CO4)
7. Write any three provisions for design of double angle strut as IS800-2007. (CO5)
8. Draw the cross section of plate girder and label the component parts. (CO5)
9. Define elastic moment and plastic moment of resistance. (CO5)

10. Determine the live load per square meter of plan area of the pitched roof of slope 26°.(CO5)

PART – B **5 x 10 = 50 marks**

Instructions:

i) **Answer any FIVE questions**
ii) **Each question carries TEN marks.**
iii) **Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.**

11. An angle ISA 100 mm × 100 mm × 12 mm is carrying an axial design tensile force of 220 kN acting through the CG of the angle isto be connected to a gusset plate 12 mm thick by a lap joint using side welds and end welds, at site. Design the joint taking the ultimate design stress in the filet weld as 410N/mm2. (CO2)

12.Determine the design strength of a tensile member ISA 100 mm × 75 mm × 10 mm when its longer leg is connected to 10 mm gusset plate by 7 mm size fillet welds. The effective length of the weldis170mm.[Takef y=250Mpa andf u=410Mpa.](CO3)

13. Design a double angle tension member to carry an axial tension of 480 kN, using steel of yield stress 250 N/mm2& ultimate stress 410 N/mm2. The effective length of the member is 6 m. The angle are tobeconnectedoneithersideof12mm gusset plate by fillet welds. (CO3)

14. Design a steel column using a single rolled I-section to carry an axial load of 800 kN. One end of the column is restrained against translation and rotation and the other end is restrained against translation and free against rotation. The actual length of the column between intersections is 6 m and the yield stress of steel is250Mpa.(CO4)

15. Design a slab base for a column consisting of ISHB 350 @724 N/m. The column carries an axial load of 520kN. M20 grade concrete is used for foundation. Assume Fe-410 grade steel used.
(CO4)

16. Determine the design compressive strength of single angle discontinuous strut ISA 80 mm ×80 mm × 10 mm of length 2 m when connected to gusset plate through one leg by fillet welds at each end. Yield stress of steel used is 340 Mpa and modulus of elasticity of steel is 2×10^5 Mpa. The gusset fixity may be taken as hinged. (CO4)

17. Find the shape factor for an I Section with top and bottom flange 200mmX10mm and web 380mmX10mm. (CO5)

18. A roof a hall measuring 8m X 12m consists of 100mm thick RCC slab supported on steel I beam spaced at 3m apart. The finishes load may be taken as 1.5kN/m2,l ive load as1.5 kN/m2 and self weight of beam as 0.5 kN/m. Design the steel beam. Assume E=2x105 N/mm2 and fy=250 N/mm2 (CO5)