Reg. No.											

Question Paper Code	11505

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022
Sixth Semester
Civil Engineering
CE8601 - DESIGN OF STEEL STRUCTURAL ELEMENTS
(Usage of IS 800 and Steel Tables are permitted)
(Regulations 2017)

Duration: 3 Hours   Max. Marks: 100

PART-A (10 × 2 = 20 Marks)
Answer ALL Questions

		Marks, K-Level, CO
1.	What is a partial safety factor?	2,K1,CO1
2.	What are the various types of structural steel section?	2,K1,CO1
3.	Define staggered pitch.	2,K1,CO3
4.	Distinguish between gauge distance and pitch of the bolt.	2,K2,CO3
5.	Define slenderness ratio.	2,K1,CO4
6.	What is net sectional area?	2,K2,CO4
7.	Define single lacing and double lacing.	2,K1,CO5
8.	What is the purpose of gusset plate?	2,K2,CO5
9.	Define laterally restrained beams.	2,K1,CO6
10.	What do you mean by castellated beam?	2,K2,CO6

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11. a) Explain about types of loads on structures and load combinations.   13,K2,CO1

OR

b) Explain in detail about the structural systems in steel.   13,K2,CO1

12. a) A single-bolted double-cover butt joint is used to connect two plates of   13,K3,CO3
8 mm thickness. Assuming 20 mm bolts at a pitch of 50 mm, Calculate
the efficiency of the joint. The thickness of cover plate is 4 mm.

OR

b) An angle section ISA 80mmX50mmX8mm is welded to a 12mm thick   13,K3,CO3
gusset plate at site. Design the weld to transmit the load equal to the
strength of the members. Grade of steel Fe 410.

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **11505**

13. a) A tension member consists of two angle sections and carries a load of 210 kN. Design the member when both the angles are connected on the same side of the gusset plate.   *13,K3,CO4*

OR

b) Design a tension member carrying a load 600 kN. The length of the member is 2.5m. The member is connected to 12mm thick gusset plate 20mm bolts.   *13,K3,CO4*

14. a) Design a built-up column with single angle lacing system to carry a load of 400 kN. The length of the column is 6 m. It is restrained in rotation but not in direction at both the ends   *13,K3,CO5*

OR

b) Design a column with double lacing system to carry a factored axial load of 1800 kN. The effective height of column is 4.5m. Use two channels placed back to back.   *13,K3,CO5*

15. a) Design an angle purlin for a roof with the following data.   *13,K3,CO6*
    Span of truss   : 8m
    Spacing of truss   : 4m c/c
    Pitch of truss   : ¼
    Spacing of purlins along the slope truss: 2m c/c
    Roof coverings   : Asbestos sheets
    Basic wind pressure   : 1.5 kN/sq.m

OR

b) Find the suitable design for a simply supported steel joist with a 4 m effective span carries anudl of 40kN/m over its span inclusive of self weight. The beam is laterally unsupported. Take $f_y = 250\text{N/mm}^2$.   *13,K3,CO6*

PART - C (1 × 15 = 15 Marks)

16. a) Explain about i) Working stress Method ii) Limit state Method in design of steel elements.   *15,K2,CO2*

OR

b) Explain the concept of allowable stress design of angle, tension and compression members   *15,K2,CO2*