Reg. No.											

Question Paper Code	12623

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024
Sixth Semester
Civil Engineering
20CEPC601 - DESIGN OF STEEL STRUCTURES
Regulations - 2020

(Use of IS 800-2007 Code book and Steel Table books are permitted)

Duration: 3 Hours   Max. Marks: 100

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

		Marks	K–Level	CO
1.	What are the types of structural steel?	2	K1	CO1
2.	List the mechanical properties of Steel.	2	K1	CO1
3.	Define structural connection.	2	K1	CO2
4.	What are the various types of connections used for connecting the structural members?	2	K1	CO2
5.	Summarize the formula for design strength due to yielding of critical section.	2	K1	CO3
6.	Discuss Shear Lag in Tension member.	2	K2	CO3
7.	Define compression member.	2	K1	CO4
8.	Describe the effective length of column based on end condition.	2	K2	CO4
9.	What is laterally supported beam?	2	K1	CO5
10.	List the various components of a roof truss.	2	K1	CO6

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

				Marks	K–Level	CO
11.	a)	Explain about types of loads on structures and load combinations.		13	K2	CO1
		OR				
	b)	Draw a typical stress-strain for mild steel and explain the salient points on it and also discuss about the different structural steel products.		13	K2	CO1
12.	a)	Design a lap joint between the two plates each of width 120mm, if the thickness of one plate is 16 mm and the other is 12 mm. The joint has to transfer a design load of 160kN. The plates are of Fe 410 grade. Use bearing type plates.		13	K3	CO2
		OR				
	b)	Design a butt joint to connect two plates 150 mm x 12 mm .Use M16 bolts of grade 4.6. Find the efficiency of the joint.		13	K3	CO2

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

13. a) Design a splice to connect a 300 x 20 mm plate with another plate 300 x 10 mm. Design load is 600 KN. Use 20 mm bolts of shop prefabrication. Assume the joint as butt joint.   *13 K3 CO3*

OR

    b) Design tensile strength of roof truss diagonal 100x75x8mm connected to gusset plate by 5mm width. Assume length of weld at top is 130mm and 300mm. Also assume thickness of gusset plate as 10mm.   *13 K3 CO3*

14. a) Design a slab base for a column ISHB at 588 N/m carrying an axial load of 1000 KN. M20 concrete is used for the foundation. Provide welded connection between column and base plate.   *13 K3 CO4*

OR

    b) Design a single angle strut connected to the gusset plate to carry a 200 KN factored load. The length of strut between centre to centre is 4 m.   *13 K3 CO4*

15. a) Explain the design procedure for Laterally supported beam with necessary formulae.   *13 K3 CO5*

OR

    b) Design a welded plate girder of span 26m to carry super imposed load of 40KN/m. Avoid use of bearing and intermediate stiffeners. Use Fe 415 (E250) Steel.   *13 K3 CO5*

PART - C (1 × 15 = 15 Marks)

16. a) i) Explain the design procedure of gantry girder.   *8 K2 CO6*
     ii) Explain the different types of roof truss with neat sketches.   *7 K2 CO6*

OR

    b) Design angle section purlin for an industrial building to support a galvanised corrugated iron sheet with the following data   *15 K2 CO6*
    1.Spacing of truss = 4m
    2.Inclination of main rafter= 30^0
    3.Spacing of purlin= 1.5 m
    4. Weight of purlin= 1.5m
    5. Weight of corrugated sheeting = 150 N/m^2
    6. Live load = 0.6 KN/m^2
    7. Yield stress of steel = 250 Mpa.