Reg. No.													

Question Paper Code	11855

12 JUN 2023

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023

Sixth Semester

Civil Engineering

20CEPC601 – DESIGN OF STEEL STRUCTURES

(Regulations2020)

(Use of IS 800:2007 & Steel Tables are permitted)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

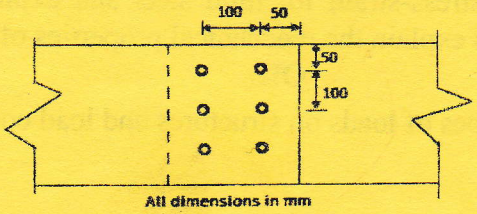
Answer ALL Questions

		Marks, K-Level, CO
1.	How the loads are classified?	*2,K1,CO1*
2.	Illustrate the advantages of HSFG Bolts	*2,K2,CO2*
3.	Calculate the tensile strength due to gross section yielding of an angle section 120×80× 10mm of Fe410 grade of steel connected with a gusset plate.	*2,K2,CO3*
4.	Mention the purpose of a lug angle.	*2,K2,CO3*
5.	Under what circumstances gusset base is used?	*2,K2,CO4*
6.	Define column splices and list its types.	*2,K1,CO4*
7.	Write a note on built up beams.	*2,K1,CO5*
8.	Distinguish between web buckling and web crippling.	*2,K2,CO5*
9.	Recall the purpose of pulin in a roof truss.	*2,K1,CO6*
10.	List the various loads to be considered in the design of gantry girders.	*2,K1,CO6*

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	Two plates 10mm and 16mm thick are to be joined by double cover butt joints. Assuming cover plates of 8mm thickness, design the joints to transmit a factored load of 450KN. Assume 410 plate and bolt of grade 4.6.	*13,K3,CO2*
		(OR)	
	b)	Determine the strength and efficiency of a bolted lap joint shown in figure. The bolts are of 20mm diameter, grade 4.6. The plates are of 12mm thick and grade Fe410.	*13,K3,CO2*



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

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12. a) Design a tension member to carry a factored tensile load of 250 kN. The 3 m long tension member is connected to a gusset plate 16 mm thick with one line of 20 mm diameter bolts of grade 4.6. Use Fe410 grade steel. *13,K3,CO3*

(OR)

b) 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*

13. a) Design a suitable slab base for a column section ISHB 400@ 822N/m. Supporting an axial load 500kN. The base plate is to rest on a concrete pedestal of M20 grade concrete. *13,K3,CO4*

(OR)

b) Design a column carrying an axial load of 1000 kN. Its length is 5 m and it is effectively held in position at both ends and restrained against rotation at one end. Assume yield stress of 250 MPa. *13,K3,CO4*

14. a) A simply supported beam of 5m span carries a UDL of 30kN/m. The beam is laterally supported. Design the beam with a suitable steel section. *13,K3,CO5*

(OR)

b) Design a laterally unrestrained cantilever beam of effective span 1.5m carrying a factored load of intensity 220kN at the free end. Assume the bearing length as 120mm. *13,K3,CO5*

15. a) Design a channel section purlin for the following data *13,K3,CO6*
1.Spacing of trusses= 6m
2.Spacing of purlin= 1.8m
3.Weight of sheet= 100 N/m^2
4.Weight of purlin= 100 N/m
5. Live load= 0.5 KN/m^2
6.Wind load= 1.5 KN/m^2
7.Inclination of main rafter= 30^0

(OR)

b) (i) List out the various elements of the roof truss and mark all its significance. *6,K2,CO6*
(ii) List the advantages and explain with a neat sketch the major components of pre-engineered steel building. *7,K2,CO6*

PART - C (1 × 15 = 15 Marks)

16. a) Draw a typical stress-strain for mild steel and explain the salient points on it. Also explain the mechanical properties of mild steel. *15,K2,CO1*

OR

b) Explain about types of loads on structures and load combinations. *15,K2,CO1*