R20 Regulation *Subject code: 3P6AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VI Semester Supplementary Examinations, November 2025

DESIGN OF STEEL STRUCTURES

(CE)

Maximum Marks: 70 Date:11.11.2025 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

ALLOW THE IS8000-2007 & STEEL TABLE BOOKS ARE ALLOWED

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	State standard or rolled structural sections.	2M	1	L1
2	What are the different types of connections in steel structures?	2M	1	L1
3	Define shear lag.	2M	2	L1
4	List classification of cross section.	2M	2	L1
5	Write the expression for design strength in bending of a laterally supported beam?	2M	3	L1
6	What do you understand laterally restrained beams?	2M	3	L1
7	What are the different parts of roof truss?	2M	4	L1
8	What are the loads acting on the roof truss and for what load combinations the truss is to be designed.	2M	4	L1
9	Name the components of plate girder.	2M	5	L1
10	Give the expression for economical depth of a plate girder.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Explain briefly various types of loads to be considered in design of steel structures.	10M	1	L2
	OR			
12	a) Write the Advantages and Disadvantages of welded connections. b) Sketch the various types of Bolted connections and Welded connections.	5M 5M	1	L2
13	Design tie member of a roof truss to carry a load of 75 KN using a single angle. Length of the member between the nodal points is 1.2 m. Design a suitable weld to connect the member to a gusset plate of 6 mm thick.	10M	2	L2
	OR			
14	Design a slab base for a column ISHB 350 carrying an axial factored load of 200 kN. M25 concrete is used for the foundation. Provide welded connection between column and base plate. Sketch the column base and details of the section.	10M	2	L2

15	A simply supported steel joist of 4.0 m effective span is laterally supported throughout. It carries a total uniformly distributed load of 40 kN (inclusive of self-weight). Design an appropriate section using steel of grade Fe 410.	10M	3	L2
	OR			
16	An ISLB 350 @495 N/m transmits an end reaction of 350KN to the web of an ISMB500 @869N/m. Design a framed connection.	10M	3	L2
17	Design a purlin for a roof truss having the following data: Span of the truss = 9.0m, Spacing of truss = 3m c/c, Inclination of roof = 300 Spacing of Purlin = 2m c/c Wind pressure = 1.5 kN/m^2 , Roof coverage= A.C Sheeting weighing 200 N/m^2 , Provide a channel section for Purlin	10M	4	L2
	OR			
18	Explain in detail the steps involved in the design of a roof truss.	10M	4	L2
19	Design a welded plate girder for an effective span of 35m carrying a UDL 25kN/m and two concentrated loads of 100kN each, acting at 10m from both the ends. The girder is simply supported and fully restrained against lateral buckling throughout the span.	10M	5	L2
	OR			
20	A welded plate girder is made up of 2500 × 12 mm web plate, flange plate of 500 × 50 mm. The girder has a span of 40 meters. It carries a load of 50 KN/m inclusive self-weight over the span. Design the intermediate stiffener.	10M	5	L2