R22 Regulation *Subject code:4E6AC*

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: 60 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 10 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 (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	What is HYSD steel?	1M	1	BL1
b)	Compare yield strength with ultimate strength.	1M	1	BL2
c)	Write the factors affecting buckling of slender columns.	1M	2	BL2
d)	Give the purpose of Lug angle.	1M	2	BL1
e)	What are flexural members? Give examples.	1M	3	BL1
f)	List the use of stiffened connections.	1M	3	BL1
g)	What is the function of purlins in roof trusses?	1M	4	BL1
h)	Differentiate between king post and queen post truss.	1M	4	BL2
i)	List the components of a plate girder.	1M	5	BL1
j)	Why flange splices are needed?	1M	5	BL2

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	Two plates 10 mm and 8 mm thick are connected by double cover butt joint made of 8 mm cover plate. Record the strength of the joint. If 4 numbers of M20 bolts of grade 4.6 and Fe 415 are used on either sides of the joint in two rows with pitch of 60 mm and edge distance of 40 mm in both direction.	10M	1	BL4
	OR			
3	An ISA 55 x 55 x10 mm carries a tensile load of 200 kN, applied along its centroidal axis. This angle is to be welded to a gusset plate. Find out the lengths of side fillet welds required at the heel and toe of the angle.	10M	1	BL4
4	Design a single angle equal section 100 x 100 x 10 mm, connected to a gusset plate at the ends with 20 mm diameter bolts with the connection length of 250 mm to transfer tension.	10M	2	BL5
	OR			
5	Design a column using a rolled steel I-section with cover plates to carry a factored axial load of 2200 kN. The effective length in both the planes is 5	10M	2	BL5

	m. Take fy = 240 MPa and E= 203 GPa.			
6	Design a laterally supported I-beam for a span of 4 m carrying 30 kN/m. Use rolled section. Assume fy=250 MPa.	10M	3	BL5
	OR			
7	Design a bolted eccentric connection with bolts placed on one side of the plate only. Load = 120 kN, e = 90 mm. Assume suitable data, if necessary.	10M	3	BL5
8	Calculate the dead load, live load and wind load on a 'Fink' type truss for the following data and mark the loads on the nodes of the truss. Span = 12 m , rise = 3 m, Pitch = ¼ of span, Height at eaves level = 10 m from the ground Spacing of truss = 5 m c/c. Assume suitable data.	10M	4	BL4
	OR			
9	Recommend the design for a channel section purlin for the following data: Spacing of trusses =4.2 m , Spacing of purlin= 2 m, Live load on galvanized iron roofing sheets = 0.6 kN/m^2 , Wind load = 1.4 kN/m^2 , Slope of main rafter = 31°	10M	4	BL4
10	A welded plate girder of span 26 m is laterally restrained throughout its length. It has to carry a load of 90 kN/m over the whole span besides its weight. Design the girder without intermediate transverse stiffeners.	10M	5	BL4
	OR			
11	Design a bearing stiffener for a welded plate girder with the following specifications: Web = 1000 mm x 6 mm thick, Flanges = 2 Nos. of 350 X 20 mm plate on each side, Support reaction = 350 kN and Width of the support = 300 mm.	10M	5	BL5