



R20 Regulation

Subject code:3P6AC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, May 2025

DESIGN OF STEEL STRUCTURES

(CE)

Maximum Marks: 70

Date: 20.06.2025

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 IS 800-2007 CODE BOOK AND STEEL TABLE BOOKS ARE ALLOWED

Part-A

All the following questions carry equal marks (10X2M=20 Marks)				
		Marks	CO	BTL
1	List the various types of connections used for connecting the structural members.	2M	1	L1
2	List the types of failures occur in riveted joint.	2M	1	L1
3	Define tension member.	2M	2	L1
4	Classify the modes of failure in Tension member.	2M	2	L1
5	Define shape factor and what is meant by slender section.	2M	3	L1
6	Write the various factors affecting the lateral-torsional buckling strength?	2M	3	L1
7	How do you improve the shear resistance in plate girder?	2M	4	L1
8	What are the classifications in Stiffeners?	2M	4	L1
9	Write the different types of loads acts on the roof truss?	2M	5	L1
10	What are the major steps involved in design of roof truss.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)				
		Marks	CO	BTL
11	Two plates 10 mm and 20 mm thick are connected by double cover butt joint made of 8mm cover plate. Determine the strength of the joint. If 6 numbers of M20 bolts of grade 4.6 and Fe 415 are used on either side of the joint in two rows with pitch of 60mm and edge distance of 40mm in both directions.	10M	1	L2
OR				
12	a) Describe design philosophies for structural steel. b) Show the various limit states to be considered in design of steel structures.	5M 5M	1	L2
13	Determine the tensile strength of a roof truss member 2 ISA 90x60x6 mm connected to the gusset plate of 8 mm thickness by 4mm weld. The effective length of weld is 200mm.	10M	2	L2
OR				
14	A 4.8m long column with one end fixed and other end hinged is made of ISMB 400 with a flange plate of 300 x 20 mm welded to each flange. Determine the load carrying capacity of the column section, if the grade of steel is Fe415 / E250.	10M	2	L2

15	Explain the notes on: (i) Bending strength of a laterally supported beam (ii) Shearing strength of a laterally supported beam	5M 5M	3	L2
OR				
16	Find the suitable design for a simply supported beam of effective span 10m carrying a factored load of 35kN/m. The compression flange of the beam is laterally restrained all along and provided with stiffened end bearing of 100mm wide. The overall depth of the beam is restricted to 450mm.	10M	3	L2
17	Explain the various elements of the roof truss and mark all its significance.	10M	4	L2
OR				
18	Design an I-section purlin for a roof truss having the following data: Span of the truss = 7m ,Spacing of truss = 3m c/c, Inclination of roof = 30° Spacing of Purlin = 2m c/c Wind pressure = 1 kN/m ² , Roof coverage= A.C Sheeting weighing 200 N/m ² , Provide a channel section Purlin.	10M	4	L2
19	Design a bearing stiffener for a welded plate girder with the following specifications. Web = 1000mm x 6mm thick. Flanges = 2 Nos. of 350x20 mm plate on each side. Support reaction = 350kN. Width of the support = 300mm.	10M	5	L2
OR				
20	A plate girder of span 15m is made-up of web plates of 1500mm x 7mm flange angles 150x115x10 mm and two flange plates 480 x10 mm, it carries a uniformly distributed load of 110 kN/m including its own weight. Identify the suitable design and sketch the web splices at 4m from one end.	10M	5	L2