



R20 Regulation

Subject code:3P6AC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, December 2024

DESIGN OF STEEL STRUCTURES (Civil Engineering)

Maximum Marks: 70

Date:02.01.2025

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 which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20) Marks)		CO	Bloom Tx
1	What are the various types of rolled structural steel sections?	1	L1
2	List the various types of welded joints.	1	L1
3	Classify the modes of failure in Tension members.	2	L1
4	Define slenderness ratio.	2	L1
5	Define shape factor.	3	L1
6	Define Web crippling?	3	L1
7	List any four types of roof covering materials.	4	L1
8	Specify any four suitable types of trusses for different spans.	4	L1
9	State the situations where the plate girders are necessary?	5	L1
10	Give the expression for economical depth of a plate girder.	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	A) Write the Advantages and Disadvantages of welded connections (5M) B) Briefly explain the various stability checks considered by the IS code. (5M)	1	L2
OR			
12	Design a lap joint between the two plates each of width 120mm, if the thickness of one plate is 16mm and the other is 12mm. The joint has to transfer a design load of 160 KN. The plates are of Fe410 grade. Use bearing type bolts. (10M)	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	A column ISHB350@661.2 N/m carries an axial compressive factored load of 1700 kN. Design a suitable welded gusset base. Assume M20 grade concrete. (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 ISMB500 beam transmits an end reaction of 250 kN to the web of a column ISHB300@577 N/m. Design and sketch a stiffened seated connection. Use M24 black bolts. (10M)	3	L2
17	Design a purlin for a roof truss having the following data: (10M) 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 Sheetting weighing 200 N/m ² , Provide a channel section for Purlin	4	L2
	OR		
18	Explain in detail the steps involved in the design of a roof truss. (10M)	4	L2
19	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
	OR		
20	Explain stiffness bearing and intermediate stiffeners with neat sketch. (10M)	5	L2