



R18 Regulation

Subject code:2P6AC

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	Write the Physical and Mechanical properties of structural steel?	1	L1
2	Define Lap joint & butt Joint with neat sketch.	1	L1
3	Explain the terms: a) Gross Area b) Net Area	2	L1
4	Write a short note on classification of cross section?	2	L1
5	What is laterally supported beam? Write the expression for design strength in bending of a laterally supported beam?	3	L1
6	Classify different types of eccentric connections.	3	L1
7	Write the components of roof trussed?	4	L1
8	What is a truss? Differentiate between a plane truss and space truss.	4	L1
9	Mention different type of stiffeners in plate girder?	5	L1
10	Why are intermediate stiffeners required for plate girders?	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	Explain briefly various types of loads to be considered in design of steel structures. [10M]	1	L2
OR			
12	Design a bolted lap joint connecting two steel plates of size 100 mm × 16 mm and 100 mm × 16 mm to transmit a factored axial load of 150 kN. Assume the yield and ultimate stress of steel as 250 N/mm ² and 410 N/mm ² respectively. [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	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	Compute the moment carrying capacity and shear strength of a laterally unsupported ISMB 500 member of length 5m with $f_y = 250\text{MPa}$ [10M]	3	L2
	OR		
16	An ISMB 500 beam transmits an end reaction of 250 kN to the web of a column ISHB 300@577 N/m. Design and sketch a stiffened seated connection. Use M24 black bolts. [10M]	3	L2
17	Design angle purlin for a roof truss spaced at 4 m c/c. Angle purlins are placed 1.6 m c/c. Consider factored load on the purlin 3 kN. [10M]	4	L2
	OR		
18	A) Draw the line sketches and name the components of: [4M] i) Fan truss ii) Fink truss iii) Compound Fink truss iv) Pratt truss B) A roof truss shed is to be built in Lucknow for an industry. The size of the shed is 24m X 40m. The height of the building is 12m at the eaves. Determine basic wind pressure. [6M]	4	L2
19	Design a simply supported welded plate girder of 25m span subjected to a uniformly distributed load of 30 kN/m, exclusive of self-weight. Design the connection. Use Fe410 steel. [10M]	5	L2
	OR		
20	Explain the elements of plate girder and show the economical depth of plate girder. [10M]	5	L2