R18 Regulation *Subject code: 2P6AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, July 2024

Design of Steel Structures

(CE)

Maximum Marks: 70 Date:24.07.2024 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.

ALLOW IS 800:2007 CODE BOOK AND STEAL TABLE BOOK

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	What are the different type of connections in steel structures?	1	L1
3	Define shear lag?	2	L1
4	Define slenderness ratio?	2	L1
5	What is laterally supported beam? Write the expression for design strength in bending of a laterally supported beam?	3	L1
6	Define Web Crippling?	3	L1
7	List any four types of roof covering materials.	4	L1
8	What is a truss? Differentiate between a plane truss and space truss.	4	L1
9	State the situations where the plate girders are necessary?	5	L1
10	Why are intermediate stiffeners required for plate girders?	5	L1
	Part-B		
	Answer All the following questions. (5X10M=50Marks)		
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 fy = 250MPa (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 eves. Determine basic wind pressure. (6M)	4	L2
19	Explain the elements of plate girder with neat sketch. (10M)	5	L2
	OR		
20	Design intermediate transverse stiffeners and connections without using tension field action for the welded plate girder section as follows; Web plate = 3000 mm × 8 mm; Flange plates = 500 mm × 20 mm; Factored bending moment and shear force are 4500 kN-m and 900 kN respectively. (10M)	5	L2