



R20 Regulation

Subject code: 3P6AC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Regular/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 STEEL TABLE BOOK

### Part-A

All the following questions carry equal marks (10X2M=20 Marks)		CO	Bloom Tx
1	List the various types of welded joints	CO1	L1
2	What are the advantages of bolted connections?	CO1	L1
3	What do you mean by net effective area?	CO2	L1
4	What is the significance of slenderness ratio?	CO2	L1
5	Under what circumstances would you go for built-up sections?	CO3	L1
6	Differentiate laterally supported and laterally unsupported beams	CO3	L2
7	Give general guidelines for fixing spacing of roof trusses	CO4	L1
8	What is the function of tie rod?	CO4	L1
9	What are the elements of the plate girder?	CO5	L1
10	Justify the purpose for providing the bearing stiffener and where it is used?	CO5	L5

### Part-B

Answer All the following questions. (5X10M=50Marks)			
11	A. Write the advantages and disadvantages of welded connections. [5]	CO1	L3
	B. Write the types of welded joints with the help of a neat sketch. [5]	CO1	L3
OR			
12	A. Sketch and briefly explain any three failure patterns of bolted connection. [5]	CO1	L3
	B. Describe the mechanical properties of steel. [5]	CO1	L2
13	Design a column for a load carrying capacity of 1200 kN, when the effective length of the column is 5m. [10]	CO2	L6
OR			
14	Design a tension member subjected to a pull of 350 kN using unequal angles, placed back-to-back with their longer legs connected on the same side of the gusset plate. [10]	CO2	L6
15	Design a simply supported beam of span 5 m and it has to carry a factored UDL of 35kN/m (excluding the self weight). The beam is laterally supported throughout. Use $f_y = 250$ MPa. [10]	CO3	L6
OR			

16	A. Explain Shaer lateral supported beam. [5] B. Explain bending lateral unsupported beams. [5]	CO3	L6
17	Design a purlin for a roof truss having the following data: Span of the truss = 6.0m ,Spacing of truss = 3m c/c, Inclination of roof = 30° ,spacing of purlin = 2m c/c, wind pressure = 1.5 kN/m <sup>2</sup> ,Roof coverage= A.C Sheeting weighing 200 N/m <sup>2</sup> , Provide a channel section purlin [10]	CO4	L6
	OR		
18	A pitched roof is to be provided for an industrial building of effective span 12 m. The trusses are spaced at 4 m center to center and purlins at 1.6 m center to center. The pitch of the roof is 28°. The weight of the roofing material is 16 kg/m <sup>2</sup> and the normal wind pressure is 220 kg/m <sup>2</sup> . Design a channel purlin assuming the permissible bending stress as 165 Mpa. [10]	CO4	L6
19	A welded plate girder of span 25m is laterally restrained throughout its length. It has to carry a load of 80 kN/m over the whole span besides its weight. Design the girder without intermediate transverse stiffeners. [10]	CO5	L6
	OR		
20	Design a bearing stiffener for a welded plate girder with the following specifications. Web = 1000mm X 6mm thick. Flanges = 2 Nos. of 350 X 20mm plate on each side. Support reaction = 350kN.Width of the support = 300mm [10]	CO5	L6