



R18 Regulation

Subject code: 2P4AD

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, December 2025

STRUCTURAL ANALYSIS-I

(CE)

Maximum Marks: 70

Date: 23.12.2025

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.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)				
		Marks	CO	BTL
1	Explain the term Kinematic Indeterminacy.	2M	1	L1
2	Write down the compatibility conditions for a fixed beam.	2M	1	L1
3	What are the situations where in sway will occur in portal frames?	2M	2	L1
4	State how the redundancy of a rigid frame is calculated?	2M	2	L1
5	Define: Unit load method?	2M	3	L1
6	Define radial shear and normal thrust?	2M	3	L1
7	Explain continuous beam with neat diagram	2M	4	L1
8	Define distribution factor & carry over factor	2M	4	L1
9	Define influence line	2M	5	L1
10	Explain the term focal length	2M	5	L1

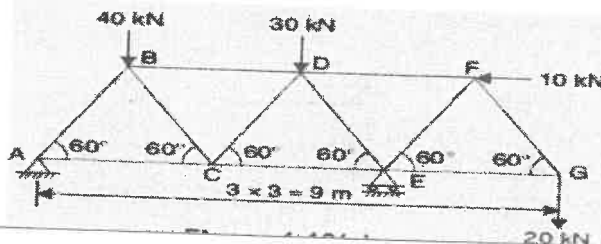
Part-B

Answer All the following questions. (5X10M=50Marks)				
		Marks	CO	BTL
11	A Cantilever of length 5m carries a point load of 24kN at its center. The cantilever is propped rigidly at the free end. Determine the reactions at the rigid prop.	10M	1	L2

OR

12	A fixed beam of length 6m carries point loads of 20kN and 15kN at distance 2m and 4m from the left end A. Find the fixed end moments and the reactions at the supports. Draw B.M and S.F diagrams.	10M	1	L2
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13	Analyze the truss shown in Fig. Determine the forces in all the members are of 3 m length.	10M	2	L2
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14	Determine the forces in the truss shown in fig. which carries a horizontal load of 12Kn and a vertical load of 18Kn.	10M	2	L2
15	Find the central deflection of a simply supported beam carrying a concentrated load at mid span. Assume flexural rigidity.	10M	3	L2
				OR
16	The figure shows a three hinged arch with hinges at a A, B and C. The distributed load of 2000N/m acts on CE and a concentrated load of 4000N at D. Determine the horizontal thrust and plot BMD.	10M	3	L2
17	A continuous beam ABCD consist of three span and loaded as shown in fig. end A and D are fixed using slope deflection method. Determine the bending moments at the supports and plot the bending moment diagram.	10M	4	L2
				OR

18	A beam ABCD, 16m long has both ends A and D fixed is continuous over three spans AB=6m, BC = 5m & CD = 5m the supports being at the same level. There is a udl of 15kN/m over BC. On AB, is a point load of 80kN at 2m from A and CD there is a point load of 50 KN at 3m from D, Determine the moments by using moment distribution method. Assume EI const.	10M	4	L2
19	Construct the influence diagram for reactions and bending moment at any section of a simply supported beam. Using the ILD, determine the support reactions and find bending moment at 2m, 4m and 6m for a simply supported beam of span 8m subjected to three-point loads of 10kN, 15kN and 5kN placed at 1m, 4.5m and 6.5m respectively.	10M	5	L2
OR				
20	Sketch the influence line diagram for S.F & B.M at 5m from the right end of a simply supported girder of span 15m. Hence find the maximum S.F and maximum B.M at the section if two wheel loads of 10Kn and 18Kn spaced 4m apart move from left to right.	10M	5	L2

