R20 Regulation *Subject code: 3P4AE*

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:29.12.2025 Duration: 3 hours

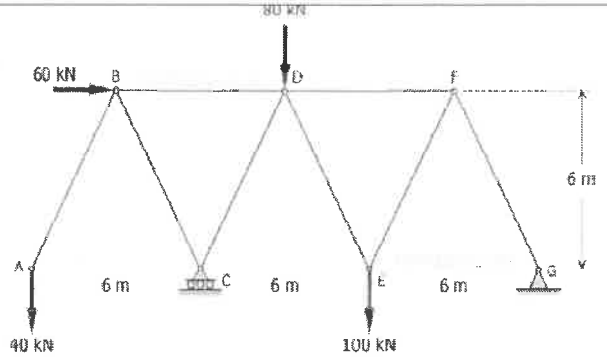
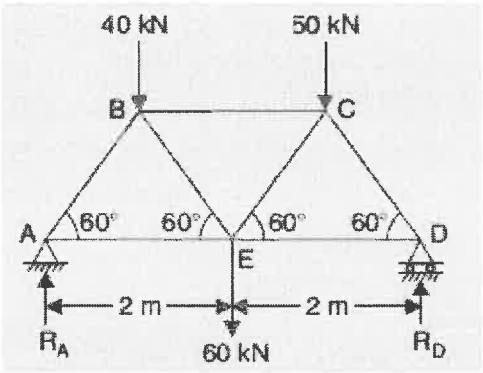
Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

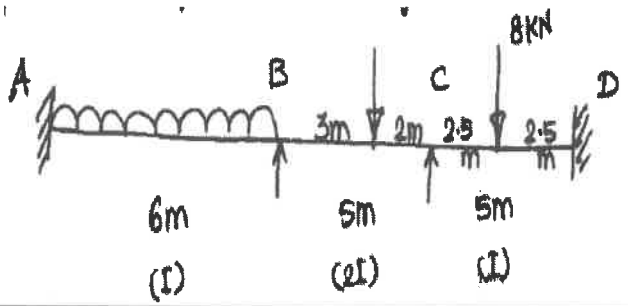
Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Define static indeterminacy.	2M	1	L1
2	Distinguish between cantilever beam and propped cantilever beam.	2M	1	L1
3	What are the methods are used to analyze the frame?	2M	2	L1
4	Unit load method is also known as?	2M	2	L1
5	Define Unit load method.	2M	3	L1
6	Define radial shear and normal thrust.	2M	3	L1
7	What is the basic assumption made in slope deflection method?	2M	4	L1
8	Define carry over factor of moment distribution method.	2M	4	L1
9	Where do you get rolling loads in practice.	2M	5	L1
10	Draw ILD of R_a & R_b for simply supported beam carrying a point load.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	A fixed beam AB of length 6m carries point load of 160 KN and 120 KN at a distance of 2m and 4m from the left end A. Determine the fixed end moments and the reactions at the supports. Draw B.M and S.F diagrams.	10M	1	L2
	OR			
12	Analyze a propped cantilever beam of length L carrying an UDL of intensity W Kn/m over a entire span, draw SFD & BMD.	10M	1	L2
13	The Warren truss loaded as shown in Fig. is supported by a roller at C and a hinge at G. By the method of sections. Determine the forces in the members DE, DF, and CD.	10M	2	L2

				
	OR			
14	Determine the forces in all the members of the truss shown in Fig. using method of joints and indicate the magnitude and nature of forces on the diagram of the truss. All inclined members are at 60° to horizontal and length of each member is 2 m. 	10M	2	L2
15	Find the deflection of the centre of a beam of span L carrying a uniformly distributed load of W per unit run over the whole span .Assume uniform flexural rigidity.	10M	3	L2
	OR			
16	A three hinged symmetric parabolic arch hinged at the crown and springing, has a span of 15m with a central rise of 3m. It carries a distributed load which varies uniformly form32kN/m (horizontal span) over the left hand half of the span. Determine the normal thrust shear force and bending moment at 5 meters from the left end hinge.	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 is fixed at A & D 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	Two concentrated rolling loads of 12 KN and 6 KN placed 4.5 m apart, travel along a freely supported girder of 16m span. Draw the diagrams for maximum positive shear force, maximum negative shear force and maximum bending moment.	10M	5	L2