R22 Regulation *Subject code: 4E5AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, May 2025

STRUCTURAL ANALYSIS-I

(CE)

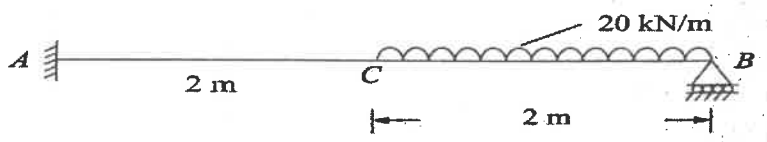
Maximum Marks: 60 Date:23.06.2025 AN Duration: 3 hours

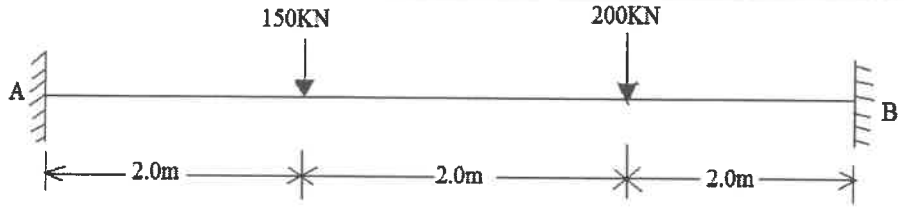
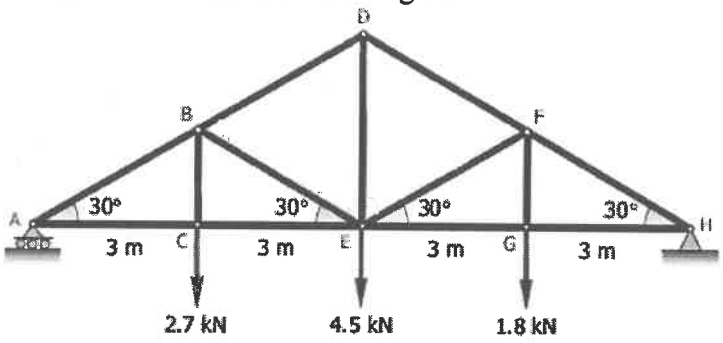
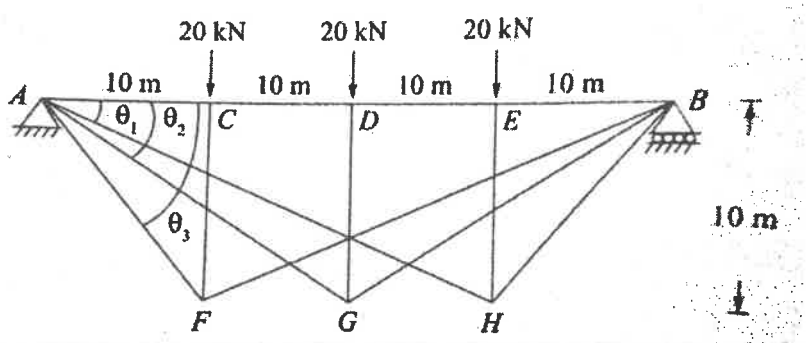
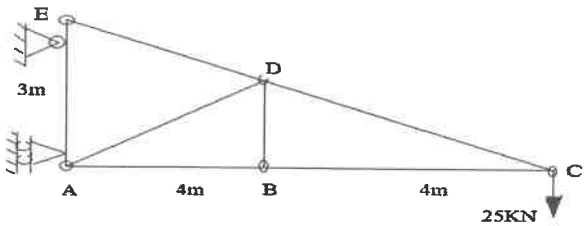
Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

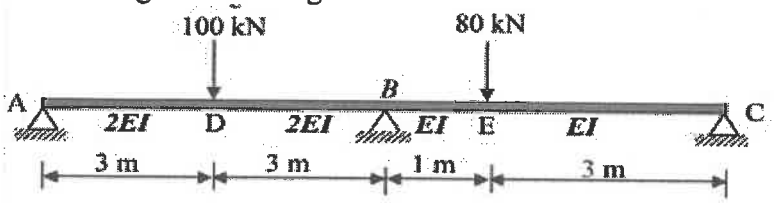
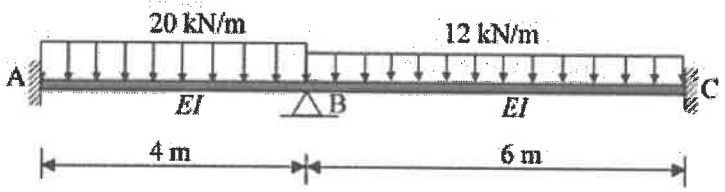
Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	Write down the compatibility condition for a fixed beam.	1M	1	1
b)	Distinguish between statically determinate and indeterminate with examples.	1M	1	4
c)	Explain in brief about imperfect, perfect and redundant pin jointed frames with suitable sketches.	1M	2	2
d)	What are the assumptions made in the Structural Analysis?	1M	2	1
e)	Compare three hinged arches and two hinged arches with suitable examples.	1M	3	4
f)	Explain Strain Energy & complimentary strain energy?	1M	3	2
g)	Why slope deflection method is called as displacement method?	1M	4	2
h)	What is sway correction?	1M	4	3
i)	State the importance of Influence line diagram.	1M	5	1
j)	Define Muller Breslau's principle.	1M	5	1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	Analyze the propped cantilever shown in Figure and draw BMD and SFD. 	10M	1	2
	OR			
3	A Fixed beam AB of span 6.0m carries point loads 150KN and 200KN as shown in Figure1. If the left and the right supports sink by 15mm and 7mm respectively, find the fixing moments at the supports. Find also the reactions at supports. Draw also the BMD for the beam. Take EI=6000KN-m^2.	10M	1	4

				
4	Use the method of sections to determine the force induced in members DF, EF, and EGof the Howe truss shown in Figure. 	10M	2	6
	OR			
5	Determine the forces in all members of truss shown in Figure by method of joints 	10M	2	4
6	A two hinged parabolic arch of span 25m and rise 5m carries a UDL of 38kN/m covering a distance of 10m from the left end. Calculate the i) Horizontal thrust ii) The reactions at the hinges iii) Maximum negative moment	4M 3M 3M	3	3
	OR			
7	a. Find the vertical deflection at 'C' of a cantilever truss shown in Figure. 	6M	3	3

	b. Derive the expression for strain energy stored in the bar due to axial load 'P'	4M		4
8	a) Analyse the continuous beam by Slope-Deflection Method and draw the bending momentdiagram.  b) Explain the use of slope deflection method.	7M 3M	4	2 5
	OR			
9	Calculate the bending moments at A, B, and C for the two-span continuous beam ABC. EI is constant by Moment distribution method  	10M	4	5
10	Two point loads of 100 kN and 50 kN at a fixed distance apart of 2m, cross a beam of 24 m span, Draw the influence line for bending moment and shear force for a point 8m from the left support, and also determine the maximum bending moment and shear force at that point.	10M	5	4
	OR			
11	a) Write the Muller Breslau principle and explain in detail about the application of principle to determinate structures. b) Draw the influence line diagram for shear force at a point X in a simply supported beam AB of span L.	7M 3M	5	1 4