R22 Regulation *Subject code:4E5AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, April 2026

STRUCTURAL ANALYSIS-I

(CE)

Maximum Marks: 60 Date:20.04.2026 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	BTL
1.a)	Mention the formula for kinematic indeterminacy is of a 2D plane frame?	1M	1	1
b)	A fixed end has how many degrees freedom?	1M	1	3
c)	What is redundant frame?	1M	2	3
d)	Weather the analysis of frames by the method of sections and method of joints will give the yield same value of internal forces?	1M	2	2
e)	For a prismatic bar write down expression of strain energy due to axial load?	1M	3	1
f)	A two hinged arch is statically indeterminate to how many degrees?	1M	3	1
g)	In the moment distribution method, for a member with a fixed far end, the stiffness is	1M	4	1
h)	At Support of Simply supported beam what is the value of bending moment at the support in slope deflection method and moment distribution method.	1M	4	3
i)	State Muller Breslau's principle?	1M	5	1
j)	How to get the maximum bending moment (BMD) for a series of point loads using an Influence Line Diagram (ILD)?	1M	5	3

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	A Propped cantilever beam is as shown in Figure 1. Analyze the beam and Draw SFD and BMD.	10M	1	4

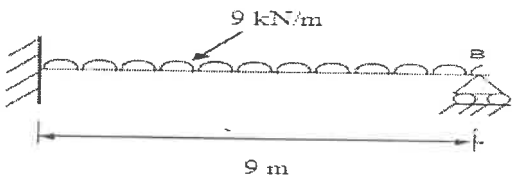
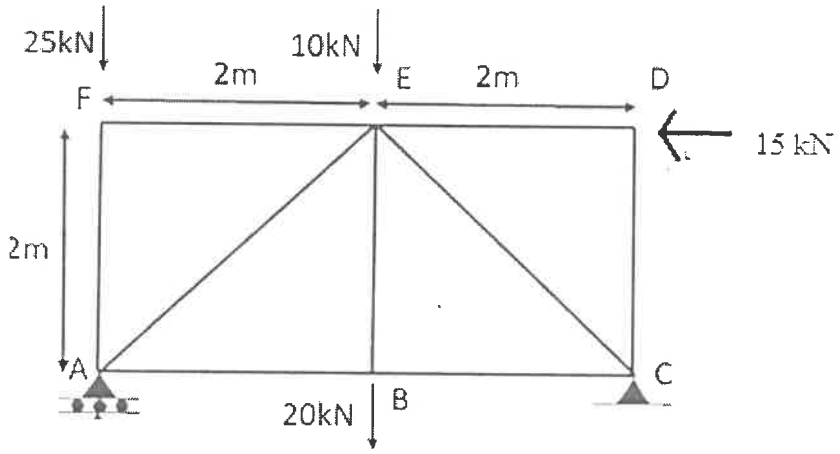
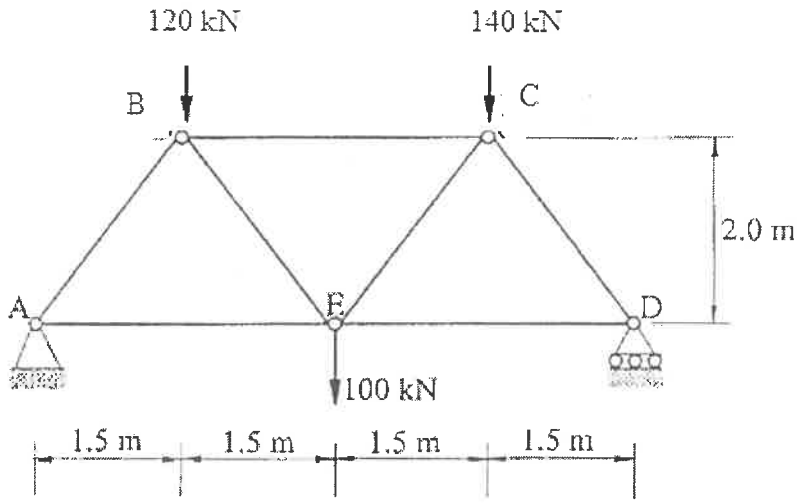
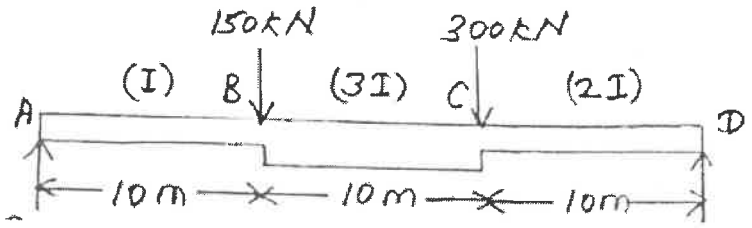
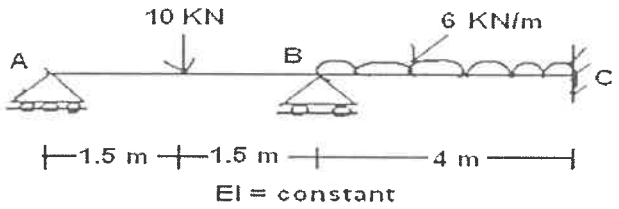
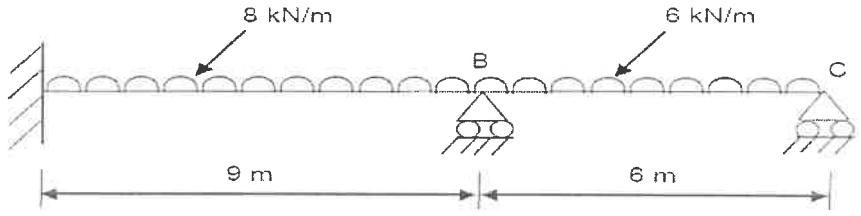


Fig. 1

	OR			
3	A fixed beam of length 6 m carries two point loads of 30 kN each at a distance of 2 m from both ends. Analyze and determine the fixed end moments and draw BMD.	10M	1	4
4	Analyze a pin jointed frame shown in figure 2 by method of joints.  Fig. 2	10M	2	4
	OR			
5	For the pin-jointed frame shown in Figure 3, analyze and determine: i) The forces in members BC and CE using the method of sections.  Fig. 3	10M	2	4

6	Find the deflection at the center and slope at the supports of simply supported beam loaded as shown in the figure 4. Take EI = $2x10^7$ Nm^2.  Fig. 4	10M	3	3
	OR			
7	A three hinged parabolic arch has a span of 10 m. The central rise of the arch is 2 m. It is loaded with a UDL of intensity 1 KN/m at the left 4 m length. (i) Calculate the maximum positive and negative bending moments. (ii) Calculate the BM, normal thrust and shear at 2 m and 7.5 m from left end.	10M	3	3
8	Analyze the continuous beam shown in figure 5 by slope deflection method. Draw shear force and bending moment diagram.  Fig. 5	10M	4	4
	OR			
9	Analyze the continuous beam shown in figure 6 by moment distribution method. Assume uniform flexural rigidity of beam ABC and EI=14×10^{11} N-mm^2.  Fig. 6	10M	4	4
10	An uniform load of 2000N/m, 5m long crosses a girder of 20m span from left to right. Calculate the Max. Shear force and bending moment at a section 8m from left hand support.	10M	5	3
	OR			
11	Derive the positive and Negative SF and Maximum BM of a SS beam carrying Two point loads with a fixed distance between them.	10M	5	3