SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year II Semester Regular Examinations July/August-2025
STRUCTURAL ANALYSIS
(Civil Engineering)

Time: 3 Hours   **Max. Marks: 70**

PART-A
(Answer all the Questions 10 x 2 = 20 Marks)

1	a	Define the term strain energy.	CO1	L1	2M
	b	Define the term modulus of resilience.	CO1	L1	2M
	c	What do you mean by indeterminate structure? Give some example.	CO2	L1	2M
	d	State Castigliano's second theorem.	CO2	L1	2M
	e	What is meant by fixed end moment?	CO3	L1	2M
	f	State some of the disadvantages of fixed beams.	CO3	L1	2M
	g	State the assumption made in the slope deflection method.	CO4	L1	2M
	h	How sign convention is adopted in slope deflection method?	CO4	L1	2M
	i	What does the distribution theorem state?	CO5	L1	2M
	j	Define stiffness.	CO5	L1	2M

PART-B
(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

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2	Derive an expression for strain energy stored in a member due to axial loading and due to bending moment.	CO1	L2	10M

OR

3	State and prove Castigliano's first theorem.	CO1	L2	10M

UNIT-II

4	A beam AB 4m long is fixed at A and propped at B. It carries a point load of 16 kN at a distance of 1m from B. Determine the reactions at the supports and also draw the S.F and B.M diagrams.	CO2	L2	10M

OR

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5	Find the reaction at the propped end for the beam loaded below. Also draw the shear force and bending moment diagrams.	CO2	L3	10M
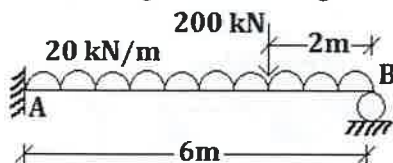
UNIT-III

6	A fixed beam AB of span 6m carries two-point loads of 100 kN and 75 kN at a distance of 2m from A and B respectively. Find the fixing moments at the ends and the reaction at the support. Also draw the shear force and bending moment diagrams.	CO3	L3	10M

OR

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7	A fixed beam of span 5m carries a uniformly distributed load of 4 kN/m over the entire span and a point load of 10 kN at the mid-span. Determine the support moment for the beam and also draw the SFD and BMD.	CO3	L3	10M

8   Analyse the continuous beam shown below using slope deflection method   CO4   L3   10M
     and sketch the shear force and bending moment diagram.
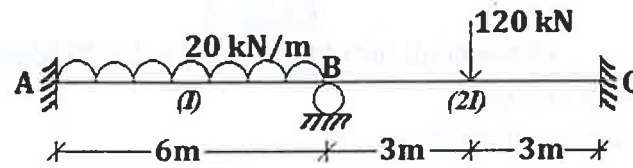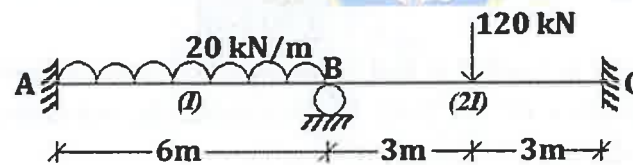

OR

9   Analyse the portal frame loaded as shown in the figure using slope-   CO4   L3   10M
     deflection method and sketch the bending moment & shear force
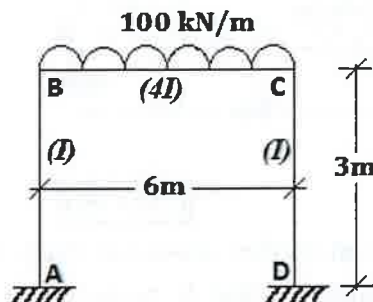   diagrams.
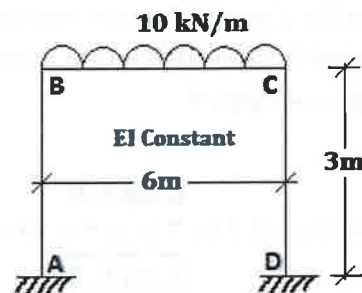
UNIT-V

10   Analyse the continuous beam shown below using moment distribution   CO5   L3   10M
      method and sketch the shear force and bending moment diagram.

OR

11   Analyse the portal frame shown in the figure using moment distribution   CO5   L3   10M
      method.

*** END ***