Q.P.Code:23CE0113 | R23 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year II Semester Regular & Supplementary Examinations March/April-2026

STRUCTURAL AMALYSIS

(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 Proof resilience.	CO1	L1	2M
	c	What do you mean by indeterminate structure? Give some example.	CO2	L1	2M
	d	Differentiate between static and kinematic indeterminacies.	CO2	L1	2M
	e	What is meant by fixed end moment?	CO3	L1	2M
	f	Write down the Claypeyron's theorem of three moments.	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

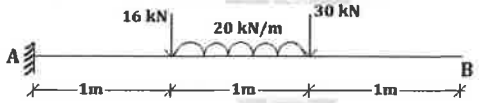
(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2		Determine the deflection at the free end of a cantilever beam subjected to a point load 'W' at the free end, using strain energy principle.	CO1	L3	10M

OR

3		Using Castigliano's theorem, determine the deflection at the free end of the cantilever beam shown below. Take EI = 4.9 MNm^2	CO1	L3	10M

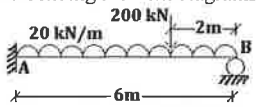


UNIT-II

4		A propped cantilever beam of span l, fixed at A, propped at B carries a uniformly distributed load of w per m run over the whole span. Find the reaction at the propped end using Castigliano's theorem.	CO2	L4	10M

OR

5		Find the reaction at the propped end for the beam loaded below. Also draw the shear force and bending moment diagrams.	CO2	L4	10M



UNIT-III

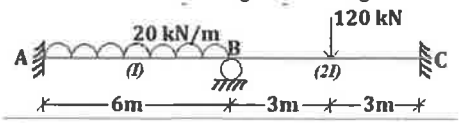
6		A fixed beam AB of span 6m carries two-point loads of 100 kN and 75 kN at a distance of 2m from A and B respectively. Find the fixing moments at the ends and the reaction at the support. Also draw the shear force and bending moment diagrams.	CO3	L3	10M

OR

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

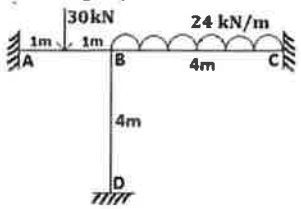
UNIT-IV

8		Analyse the continuous beam shown below using slope deflection method and sketch the shear force and bending moment diagram.	CO4	L4	10M



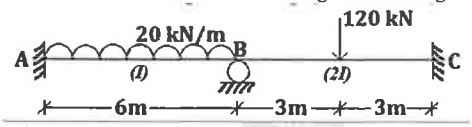
OR

9		Analyse the frame shown below using slope deflection method, by assuming uniform flexural rigidity.	CO4	L4	10M



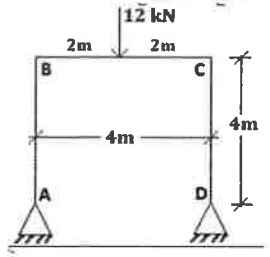
UNIT-V

10		Analyse the continuous beam shown below using moment distribution method and sketch the shear force and bending moment diagram.	CO5	L4	10M



OR

11		Analyse the portal frame shown in the figure using moment distribution method.	CO5	L4	10M



*** END ***