



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

II B.Tech II Sem Regular End Examination, July 2022

Structural Analysis – I

(Civil Engineering)

Time: 3 Hours.

Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part – A, answer all questions which carries 20 marks.

3. In Part – B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

PART- A

(10*2 Marks = 20 Marks)

- | | | | |
|---|----|-----|-----|
| 1. a) What is meant by a prop? | 2M | CO1 | BL1 |
| b) Classify structure based on degree of static indeterminacy | 2M | CO1 | BL2 |
| c) State Castiglione's First theorem. | 2M | CO2 | BL1 |
| d) State the Eddy's Theorem | 2M | CO2 | BL1 |
| e) What are the sign conventions used in slope deflection method? | 2M | CO3 | BL1 |
| f) What are the situations where in sway will occur in portal frames? | 2M | CO3 | BL1 |
| g) What is meant by perfect frame? | 2M | CO4 | BL1 |
| h) What is a indeterminate of structure | 2M | CO4 | BL1 |
| i) What will be the absolute shear force in a simply supported beam when two concentrated wheel loads cross it? | 2M | CO5 | BL1 |
| j) What is meant by influence lines? | 2M | CO5 | BL1 |

PART- B

(10*5 Marks = 50 Marks)

2. A propped cantilever of span of 6 m having the prop at the end is subjected to two concentrated loads of 24 kN and 48 kN at one third points respectively from left fixed end support. Analyze the beam and draw shear force and bending moment diagram with salient points. 10M CO1 BL3

OR

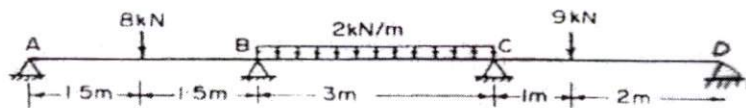
3. A fixed beam of span 4 m carries two point loads of 40kN and 60 kN at 1m and 2m from the left end respectively. Determine the fixed end moments and draw BMD and SFD. 10M CO1 BL3

4. a) Explain about temperature effect on 3 hinged arches. 4M CO2 BL4
 b) A three-hinged parabolic arch of span 20 meter and rise 4 meter carries a u.d.l load of 20 kN per meter run on the left half of the span. Find the maximum bending moment for the arch. 6M CO2 BL3

OR

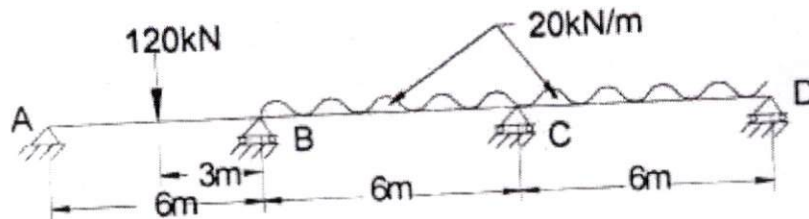
5. Using Strain Energy theorem, Calculate Max.slope and Max.deflection for a simple supported beam carrying a point load 'W' at the center of the span of L m 10M CO2 BL3

- 6 Analyze the continuous beam shown below by SDM. Also Draw SFD& BMD. EI is constant. 10M C03 BL4

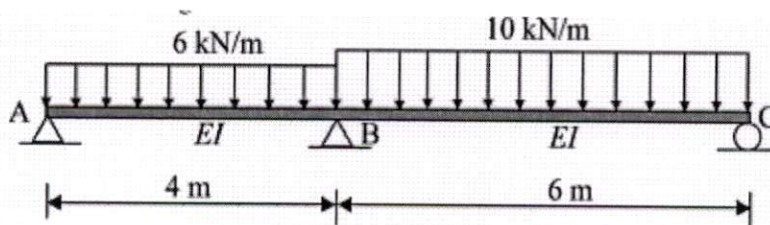


OR

- 7 Analyze the continuous beam shown below by SDM. Also Draw SFD & BMD. EI is constant. 10M C03 BL4

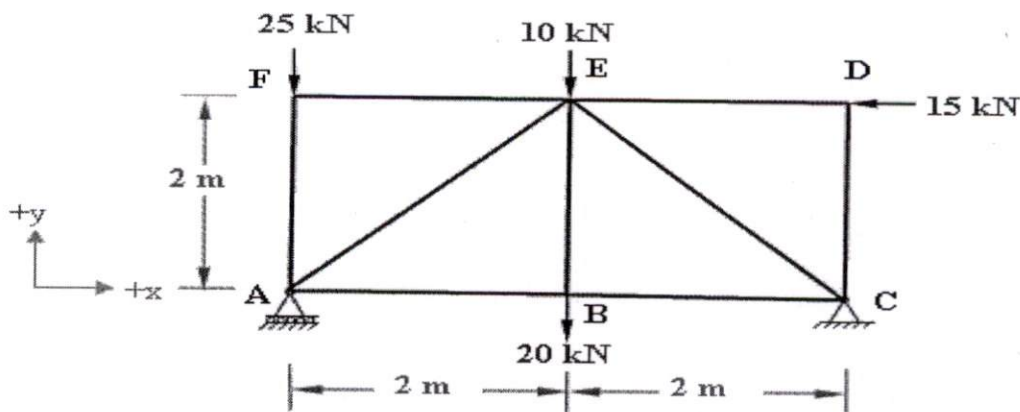


- 8 Analyze the continuous beam shown below by Three Moment Equation and draw the bending moment diagram. 10M C04 BL4



OR

- 9 Using method of Tension coefficient, determine the forces in all the members of pin jointed plane truss as shown in figure below 10M C04 BL3



- 10 Two point loads of 180 kN and 240kN spaced at 5m apart cross a girder of 25 m span from left to right with 180 kN leading. Construct the maximum shearing force and bending moment diagrams stating the absolute maximum values. 10M C05 BL3

OR

- 11 Define ILD and construct a ILD for shear force and bending moment for a simply supported beam. Explain how this generated ILD can be used for calculating shear and bending moment for a simply supported beam carrying
 a) U.d.l shorter than the span.
 b) U.d.l longer than the span. 10M C05 BL3