

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: BTECH
BRANCH: CIVIL & ENVIRONMENTAL ENGINEERING**

**SEMESTER : IV/ADD
SESSION : SP/2025**

SUBJECT: CE207 STRUCTURAL ANALYSIS - II

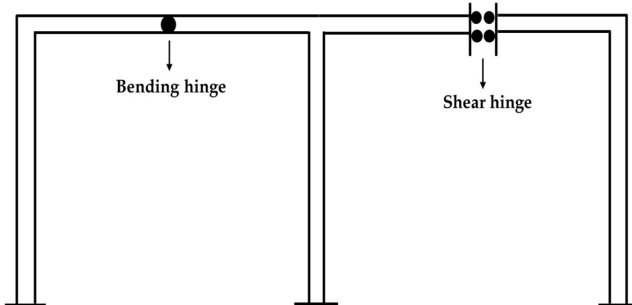
TIME: 3 Hours

FULL MARKS: 50

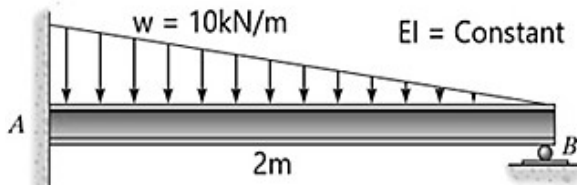
INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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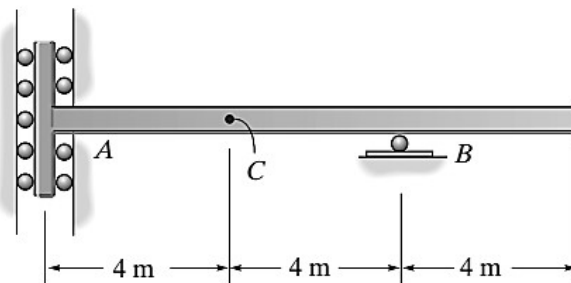
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|--|-----|----|----------|
| Q.1(a) Define the Degree of Static Indeterminacy and Degree of Freedom. Why indeterminate structures most commonly used than determinate structures. | [5] | 1 | K1,K2,K3 |
| Q.1(b) Find the Degree of Static Indeterminacy for the frame shown below and classify the structure as stable or unstable. | [5] | 1 | K1,K2,K3 |



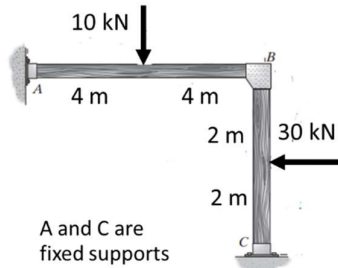
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| Q.2(a) Calculate the unknown reactions for the beam shown below using the Method of Consistent Deformation (Force Method). | [5] | 2 | K4 |
|--|-----|---|----|



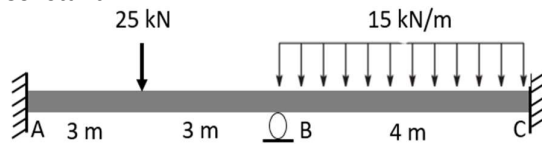
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| Q.2(b) Define Muller-Breslau Principle and draw the Influence Line Diagram (Qualitative only) for (a) Moment at B (b) Shear at C (c) Vertical reaction at B for the beam shown below. | [5] | 2 | K4 |
|---|-----|---|----|



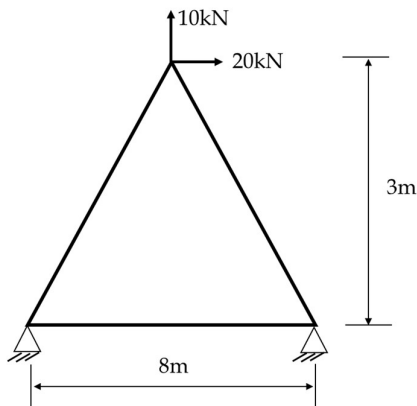
- Q.3(a) Find the unknown displacements and moments at all the joints for the frame shown below, using the Slope-Deflection Method. Assume $EI = \text{Constant}$. [5] 3 K1,K2,K3,K4



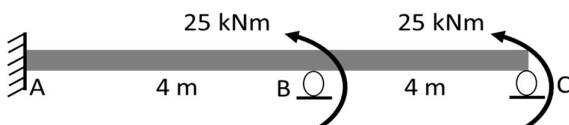
- Q.3(b) Find moments at all the joints and draw the bending moment diagram for the beam shown below, using the Moment-Distribution Method. Assume $EI = \text{Constant}$. [5] 3 K1,K2,K3,K4



- Q.4(a) Find the unknown displacements for the truss shown below using the Stiffness Matrix Method. (Assume $AE = \text{constant}$) [5] 4 K1,K2,K3,K4



- Q.4(b) Find the unknown displacements for the beam shown below using the Stiffness Matrix Method. Assume $EI = \text{constant}$ [5] 4 K1,K2,K3,K4



- Q.5 Find the horizontal thrust for the two-hinged parabolic arch shown below. [10] 5 K3,K4

