

B.Tech III Year I Semester (R20) Regular &amp; Supplementary Examinations January 2024

**STRUCTURAL ANALYSIS - II**

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**  
(Compulsory Question)

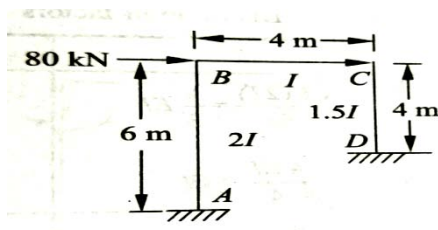
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- 1 Answer the following: (10 X 02 = 20 Marks)
- |  |    |
|--|----|
| (a) What is distribution factor in moment distribution method?   | 2M |
| (b) Explain the terms:   | 2M |
| (i) Carryover factor, (ii) Distribution factor.  |    |
| (c) What is the advantage of Kani's method over the slope deflection method?   | 2M |
| (d) Give the general expression for the Kani's rotation contribution a member AB, including sway in the frame? Describe the terms? | 2M |
| (e) Is it possible to develop the flexibility matrix for an unstable structure?  | 2M |
| (f) Why the flexibility method is also called compatibility method (method of consistent deformations) or force method?            | 2M |
| (g) Write the element stiffness matrix for a beam element.   | 2M |
| (h) How are the basic equations of stiffness matrix method obtained?   | 2M |
| (i) What is Conjugate Beam Method.   | 2M |
| (j) Determine the slope due to the applied loads.  | 2M |

**PART – B**

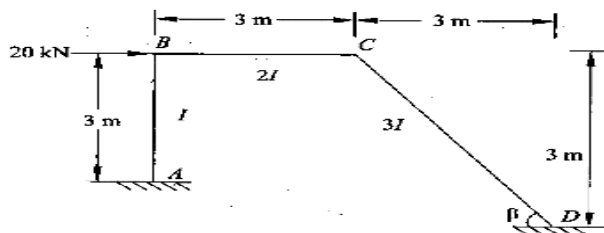
(Answer all the questions: 05 X 10 = 50 Marks)

- 2 Analyse the rigid frame shown in figure by moment distribution method. 10M



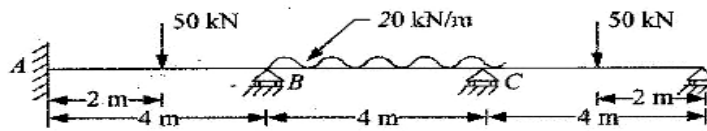
OR

- 3 Analyze the frame shown below by moment distribution method. 10M



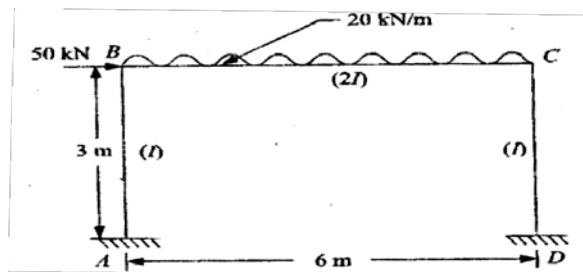
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- 4 Analyze the continuous beam shown below by Kani's method. Flexural rigidity is constant 10M throughout.

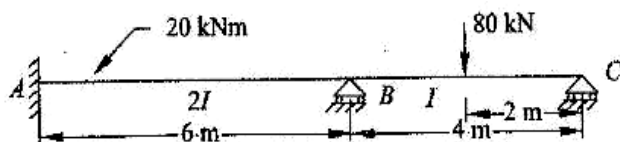


OR

- 5 Analyze the rigid jointed frame shown below by Kani's method. 10M

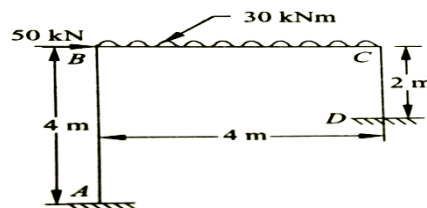


- 6 Analyze the continuous beam shown below by flexibility matrix method. 10M

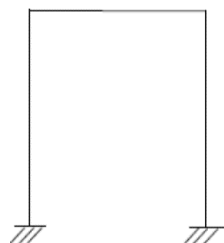


OR

- 7 Analyse the portal frame ABCD shown in figure by flexibility matrix method. EI is constant. 10M



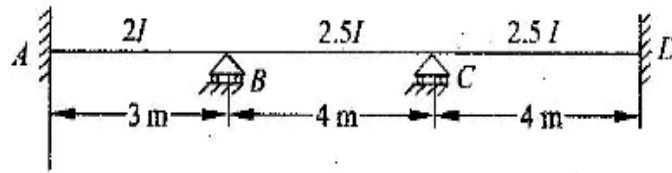
- 8 Explain the steps involved in matrix stiffness method to solve problems involving the rigid frame below: 10M



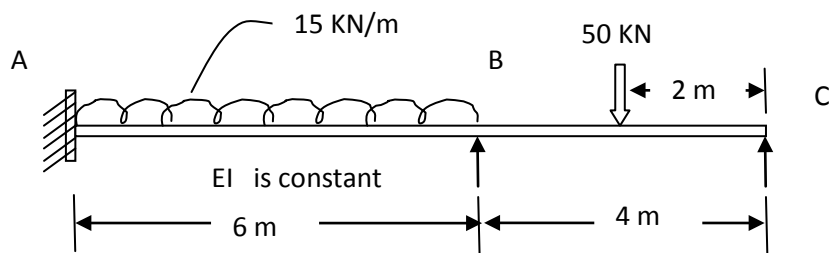
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- 9 Analyze the continuous beam shown below if the support B sinks by 10 mm. Use displacement method. Take  $EI = 6000 \text{ kN/m}^2$  10M



- 10 A Cantilever Beam subjected to point load and uniformly distributed load is shown in the figure. Use the method of Conjugate Beam Method to determine the slope and deflection due to the applied loads. 10M



OR

- 11 Derive the equation for the method of Conjugate Beam Method to determine the slope and deflection due to the applied loads. 10M

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B.Tech III Year I Semester (R20) Supplementary Examinations August 2023

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(Civil Engineering)

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**PART – A**

(Compulsory Question)

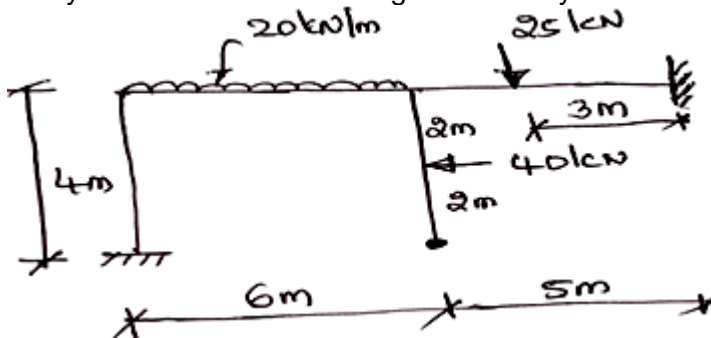
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- 1 Answer the following: (10 X 02 = 20 Marks)
- |  |    |
|--|----|
| (a) What are the situations wherein sway will occur in portal frames?  | 2M |
| (b) Distribute a moment of 6 kN-m at a joint among three members whose relative stiffness are 1/6, 1/3, and 1/2.   | 2M |
| (c) Define flexibility coefficients.   | 2M |
| (d) A steel rod of length 'l', area of cross section "A" and young's modulus "E <sub>s</sub> " is subjected to axial loads. What is its axial flexibility? | 2M |
| (e) What do you mean by global stiffness matrix?   | 2M |
| (f) Why stiffness matrix is a square matrix?   | 2M |
| (g) What is the relation between the fixed end moment and rotation moment of the ends of the member in Kani's method?                                      | 2M |
| (h) What is the value of the rotation moment at a fixed end, considered in Kani's method?  | 2M |
| (i) Why it is necessary to compute deflection in a structure?  | 2M |
| (j) Write a difference between real beam and conjugate beam.   | 2M |

**PART – B**

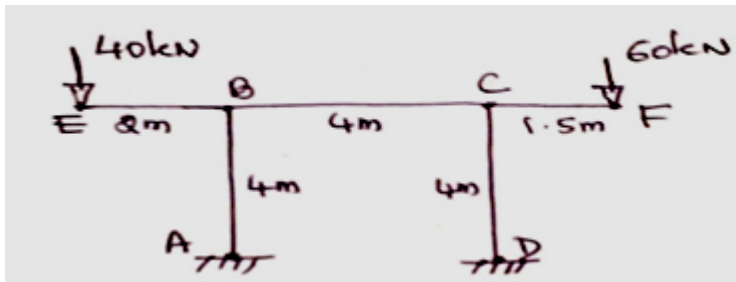
(Answer all the questions: 05 X 10 = 50 Marks)

- 2 Analyse the frame shown in figure below by moment distribution method. Draw BMD and SFD. 10M



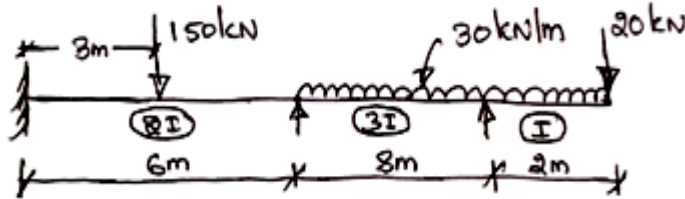
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- 3 Analyse the frame shown in Figure below by moment distribution method. Draw BMD, SFD and Elastic curve. 10M



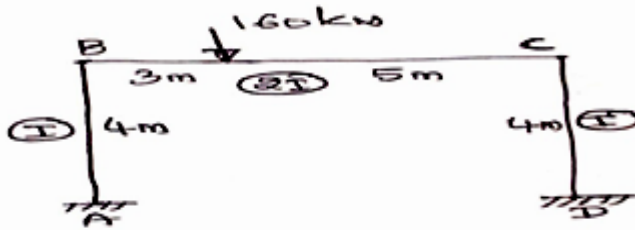
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- 4 Analyse the continuous beam shown in figure below by rotation factor method. Draw BMD, SFD and Elastic curve. 10M

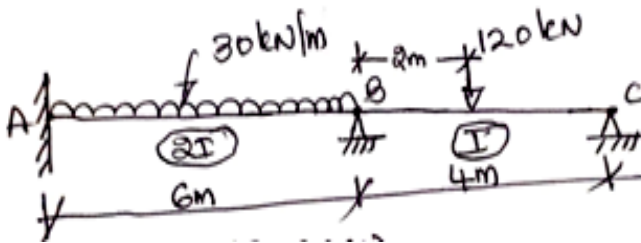


OR

- 5 Analyse the portal frame shown in figure below by rotation factor method. Draw BMD, SFD and Elastic curve. 10M

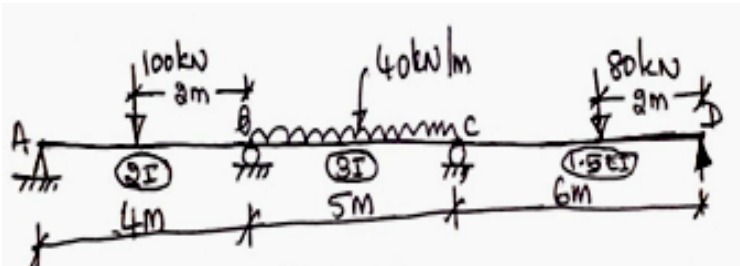


- 6 Analyse the continuous beam shown in figure below by flexibility method. If Support B sinks by 5 mm sketch BMD, SFD and elastic curve Take  $EI = 15 \times 10^3 \text{ kN-m}^2$ . 10M

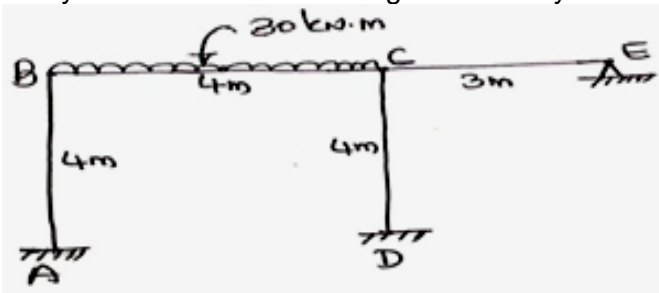


OR

- 7 Analyse the continuous beam shown in figure below by flexibility method. Draw BMD and SFD. 10M



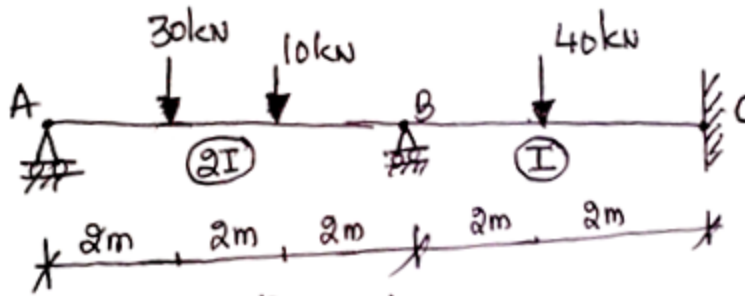
- 8 Analyse the frame shown in figure below by stiffness matrix method and draw BMD and SFD. 10M



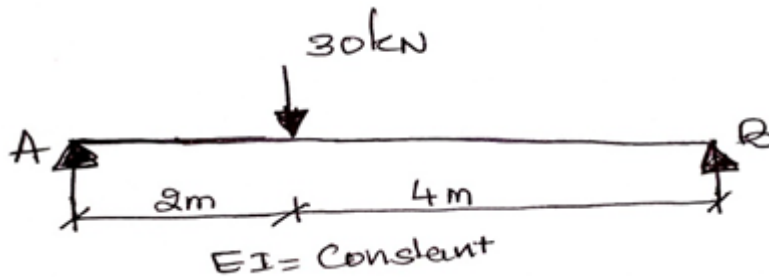
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- 9 Analyse the Continuous beam shown in figure below by stiffness matrix method and draw 10M  
BMD and SFD.

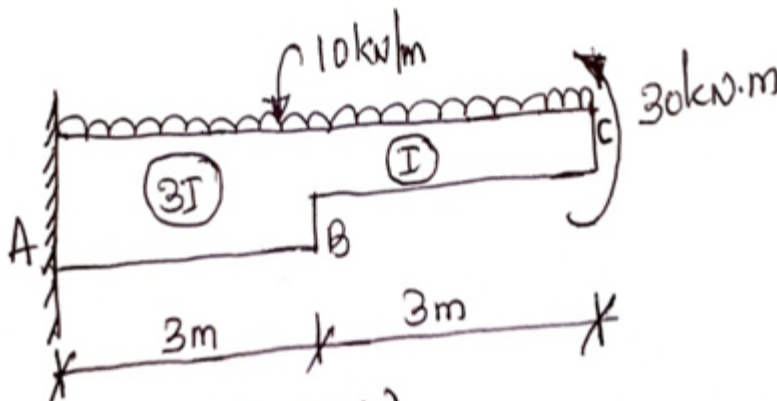


- 10 Find the maximum slope and deflection for the beam shown in figure below using conjugate 10M  
beam method. Take  $EI = 10.2 \times 10^3 \text{ kN-m}^2$ .



OR

- 11 Find the slope and deflection at free end of a cantilever beam shown in figure below using 10M  
conjugate beam method. Take  $EI = 2.5 \times 10^6 \text{ kN-m}^2$ .



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