GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEMESTER 5 – OLD PAPER – S22 TO S26 – QUESTION BANK

Subject Name & Code: Structural Analysis-II - 3150614

Chapter 1: Statically Indeterminate structure – Classical methods

Repeated Questions:

1. Slope Deflection Method (Theory):

- **Q.** Write assumptions made in slope deflection method. **(SUMMER 2022, 3 Marks; WINTER 2024, 3 Marks; SUMMER 2026, 3 Marks)**
- **Q.** Derive Slope Deflection Equation using fundamentals with usual notations. **(WINTER 2024, 7 Marks; SUMMER 2026, 7 Marks)**
- **Q.** Discuss the uses of slope deflection method. **(WINTER 2022, 3 Marks; SUMMER 2023, 3 Marks OR)**
- **Q.** Derive slope and deflection method equations from first fundamentals. **(SUMMER 2022, 4 Marks; WINTER 2023, 4 Marks OR)**

2. Moment Distribution Method – Terms (Theory):

- **Q.** Explain following terms with suitable example: Stiffness, Distribution factor, Carry over factor, Carry over moment. **(WINTER 2025, 4 Marks; SUMMER 2026, 4 Marks)**
- **Q.** Define: (i) Distribution Factor, (ii) Relative stiffness, (iii) Stiffness, (iv) Carryover factor. **(WINTER 2022, 4 Marks; SUMMER 2023, 4 Marks)**
- **Q.** Explain the terms: (a) Carryover moment, (b) Carryover factor, (c) Flexural stiffness of a member, (d) Distribution factor. **(SUMMER 2022, 4 Marks; WINTER 2023, 4 Marks OR)**

3. Portal Frames & Sway:

- **Q.** Define portal frame. Discuss the causes of sway in a portal frame. **(WINTER 2022, 4 Marks OR; SUMMER 2023, 4 Marks; SUMMER 2025, 4 Marks; SUMMER 2026, 3 Marks)**
- **Q.** Write steps for analysis of plane frame with sway by moment distribution method. **(SUMMER 2024, 4 Marks OR; WINTER 2025, 4 Marks)**
- **Q.** Derive shear equations for portal frames with side sway. **(SUMMER 2022, 4 Marks; WINTER 2022, 3 Marks OR; SUMMER 2023, 4 Marks OR; WINTER 2023, 4 Marks; WINTER 2024, 4 Marks)**
- **Q.** Define: Sway. What are the causes for Sway in portal frames? **(SUMMER 2022, 3 Marks; WINTER 2023, 3 Marks)**

4. Slope Deflection Method vs Moment Distribution Method:

- **Q.** Differentiate between slope deflection method and moment distribution method for analysis of plane frame. **(SUMMER 2024, 3 Marks; WINTER 2025, 3 Marks)**

5. Stiffness & Flexibility Methods (Theory):

- **Q.** Draw restrained structure and released structure for a propped cantilever beam. **(SUMMER 2022, 3 Marks; WINTER 2022, 3 Marks OR; WINTER 2023, 3 Marks OR; WINTER 2024, 3 Marks; SUMMER 2025, 3 Marks)**
- **Q.** For a cantilever beam, show that stiffness and flexibility matrices are reciprocal to each other. **(WINTER 2022, 7 Marks; SUMMER 2023, 3 Marks OR; SUMMER 2025, 3 Marks OR)**
- **Q.** Differentiate: Stiffness method and Flexibility method. Which method is suitable for general computer programming? Why? **(SUMMER 2022, 3 Marks OR; SUMMER 2023, 3 Marks OR; WINTER 2023, 3 Marks OR; WINTER 2024, 3 Marks OR; SUMMER 2025, 3 Marks)**
- **Q.** Enlist various categories of framed structures. **(SUMMER 2022, 3 Marks OR; WINTER 2022, 3 Marks OR; WINTER 2023, 3 Marks)**

- **Q.** State the characteristics of stiffness matrix. **(WINTER 2023, 4 Marks; WINTER 2024, 3 Marks; SUMMER 2025, 3 Marks; SUMMER 2026, 3 Marks OR)**
- **Q.** State the characteristics of flexibility matrix. **(WINTER 2024, 3 Marks OR; SUMMER 2026, 3 Marks)**
- **Q.** Differentiate between Flexibility method and Stiffness method. **(WINTER 2022, 4 Marks; SUMMER 2023, 4 Marks; SUMMER 2026, 4 Marks)**

Other Important Questions:

1. Numerical – Slope Deflection / Moment Distribution Analysis:

- **Q.** Draw qualitative shapes of influence lines for reactions in two bay- two storeyed fixed based portal frame. **(SUMMER 2022, 4 Marks OR)**
- **Q.** Calculate the distribution factor of continuous beam shown in Fig 5. Portion AB has second moment of area 1.5 I and BC is I. [Diagram required – refer to the original question paper] **(WINTER 2025, 3 Marks OR)**
- **Q.** Calculate the final end moments for continuous beam as shown in Fig 4 using the slope deflection method. [Diagram required – refer to the original question paper] **(WINTER 2025, 7 Marks)**
- **Q.** Draw SFD and BMD diagram for a beam shown in Fig: 1 using Moment distribution method OR Draw SFD and BMD diagram for a beam shown in Fig: 1 using Slope and deflection method. [Diagram required – refer to the original question paper] **(SUMMER 2026, 7 Marks)**
- **Q.** Draw bending moment and shear force diagram for a beam shown in Fig. 1 using slope deflection method. [Diagram required – refer to the original question paper] **(SUMMER 2023, 7 Marks)**
- **Q.** Analyze the frame shown in Fig. 2 by moment distribution method and draw bending moment diagram. [Diagram required – refer to the original question paper] **(SUMMER 2023, 7 Marks)**
- **Q.** Analyze the rigid frame shown in Figure 4 by moment distribution method. [Diagram required – refer to the original question paper] **(WINTER 2023, 7 Marks)**
- **Q.** Analyze the continuous beam shown in Figure 1 by slope deflection method and draw bending moment diagram. [Diagram required – refer to the original question paper] **(WINTER 2023, 7 Marks)**
- **Q.** Analyze the frame shown in Figure 2 by slope deflection method and draw bending moment diagram. EI is same for all members. [Diagram required – refer to the original question paper] **(WINTER 2023, 7 Marks)**
- **Q.** Analyze the continuous beam shown in Figure 8 by moment distribution method and draw bending moment diagram. [Diagram required – refer to the original question paper] **(WINTER 2023, 7 Marks)**
- **Q.** Analyze the continuous beam shown in Figure by slope deflection method and draw bending moment diagram. [Diagram required – refer to the original question paper] **(SUMMER 2025, 7 Marks)**
- **Q.** Analyze and Draw the SFD & BMD for the beam shown in Figure: 2 by Moment distribution method. [Diagram required – refer to the original question paper] **(WINTER 2024, 7 Marks)**
- **Q.** Analyze the beam shown in the Figure: 3 using moment distribution method and draw BMD. [Diagram required – refer to the original question paper] **(WINTER 2024, 7 Marks OR)**
- **Q.** Using slope deflection method analyze the frame shown in Fig. 7 and draw bending moment diagram. [Diagram required – refer to the original question paper] **(SUMMER 2023, 7 Marks OR)**
- **Q.** A three span continuous beam ABCD is shown in the figure-3. Write slope deflection equations only if the support A settles by 10mm, B settles by 30mm and C by 20mm. [Diagram required – refer to the original question paper] **(WINTER 2022, 3 Marks OR)**

- **Q.** Evaluate the final end moments and reactions at supports using the Moment Distribution method for the Fig 5 (OR Q.4a). [Diagram required – refer to the original question paper] **(WINTER 2025, 7 Marks OR)**

Chapter 2: Statically Indeterminate structures – Matrix methods

Repeated Questions:

1. Indeterminacy & Basic Concepts (Theory):

- **Q.** Write the differences between statically determinate and indeterminate structures. **(WINTER 2022, 3 Marks; SUMMER 2023, 3 Marks; WINTER 2024, 4 Marks; SUMMER 2026, 4 Marks)**
- **Q.** Calculate SI and KI for the beam shown in Fig.1 / Fig.6. [Diagram required – refer to the original question paper] **(SUMMER 2024, 3 Marks; SUMMER 2024, 3 Marks OR)**
- **Q.** Enlist various categories of framed structures. **(WINTER 2022, 3 Marks OR; WINTER 2023, 3 Marks)**
- **Q.** Explain various types of skeletal structures. **(SUMMER 2022, 3 Marks OR; SUMMER 2023, 3 Marks)**

2. Stiffness & Flexibility Matrices (Theory):

- **Q.** Formulate Flexibility and Stiffness Matrices for a cantilever beam. **(WINTER 2022, 7 Marks OR; WINTER 2023, 3 Marks OR)**
- **Q.** State the characteristics of stiffness matrix. **(WINTER 2023, 4 Marks; WINTER 2024, 3 Marks; SUMMER 2025, 3 Marks)**
- **Q.** Write the differences between Stiffness and Flexibility matrix methods. **(WINTER 2022, 4 Marks; SUMMER 2023, 4 Marks)**
- **Q.** Define Stiffness. Derive relation between stiffness and flexibility. **(SUMMER 2022, 3 Marks; SUMMER 2025, 4 Marks)**

3. Stiffness Method (Numerical):

- **Q.** Formulate the stiffness matrix for the beam / frame shown in Fig.1 / Fig.2. Also write the stiffness equation. [Diagram required – refer to the original question paper] **(SUMMER 2024, 4 Marks; SUMMER 2024, 4 Marks)**
- **Q.** Solve the stiffness equation and evaluate the reactions and end moments for the beam / frame shown in Fig.1 / Fig.2. Draw SFD and BMD. [Diagram required – refer to the original question paper] **(SUMMER 2024, 7 Marks; SUMMER 2024, 7 Marks)**
- **Q.** Analyse the beam shown in Fig: 9 by stiffness method. [Diagram required – refer to the original question paper] **(SUMMER 2026, 7 Marks)**
- **Q.** Determine the stiffness matrix of an axially rigid Cantilever beam with span L and flexural rigidity EI. **(WINTER 2025, 4 Marks; WINTER 2025, 7 Marks)**

4. Flexibility Method (Numerical):

- **Q.** Formulate flexibility matrix for the actions for a beam shown in Fig: 8. [Diagram required – refer to the original question paper] **(SUMMER 2026, 4 Marks)**
- **Q.** Using flexibility method analyse the beam ABC fixed at A and supported on rollers at B and C as shown in Fig: 7. [Diagram required – refer to the original question paper] **(SUMMER 2026, 7 Marks)**
- **Q.** Analyze the beam shown in Fig. 3 by flexibility method. [Diagram required – refer to the original question paper] **(SUMMER 2023, 7 Marks OR; SUMMER 2023, 7 Marks OR; SUMMER 2025, 7 Marks)**
- **Q.** Analyze the propped cantilever beam shown in Figure 9 by flexibility method. [Diagram required – refer to the original question paper] **(WINTER 2023, 7 Marks OR; WINTER 2024, 7 Marks)**

Other Important Questions:

1. Indeterminacy & Basic Concepts (Theory):

- **Q.** Define: 1) Action and 2) Displacement **(WINTER 2022, 3 Marks)**

- **Q.** Explain the terms degree of static and kinematic indeterminacy. **(WINTER 2023, 3 Marks)**
- **Q.** Determine the Kinematic Indeterminacy or Degree of Freedom for problems given in Q. 3 Fig. 3. [Diagram required – refer to the original question paper] **(WINTER 2025, 7 Marks)**
- **Q.** List out the different types of displacement methods used in structural analysis. **(WINTER 2025, 3 Marks)**

2. Stiffness & Flexibility Matrices (Theory):

- **Q.** Explain essential features of stiffness method. **(SUMMER 2022, 4 Marks OR)**
- **Q.** Describe the properties of stiffness matrix for structural analysis. **(WINTER 2025, 4 Marks - Page 4)**

3. Stiffness Method (Numerical):

- **Q.** Analyse the beam shown in Fig.6 by stiffness method. [Diagram required – refer to the original question paper] **(SUMMER 2022, 7 Marks OR)**
- **Q.** A unit rotation, without any vertical displacement, is applied at support A of a prismatic beam AB with both ends fixed and of length L and flexural rigidity EI. Evaluate is the moment induced at support B? **(WINTER 2025, 3 Marks)**
- **Q.** In a simply supported beam, two end rotations are adopted as available degrees of freedom to express stiffness matrix of the structure. The half span of beam from left side has flexural rigidity two times more than remaining span. Determine the stiffness matrix. **(WINTER 2025, 7 Marks)**
- **Q.** Assume that you are calculating deflection at the free end of a cantilever beam under some transverse load conditions. Now, if the stiffness matrix of this linear elastic beam is halved without changing loading condition, then what will be the deflection value at the free end now? **(WINTER 2025, 3 Marks - Page 4)**

4. Flexibility Method (Numerical):

- **Q.** Analyse L-bent shown in Fig.5 using flexibility method. [Diagram required – refer to the original question paper] **(SUMMER 2022, 7 Marks OR)**
- **Q.** Analyse the beam shown in Fig.6 by flexibility method. [Diagram required – refer to the original question paper] **(SUMMER 2022, 7 Marks)**
- **Q.** In a simply supported beam, two end rotations are adopted as available degrees of freedom to express stiffness matrix of the structure. The half span of beam from left side has flexural rigidity two times more than remaining span. Determine the flexibility matrix. **(WINTER 2025, 7 Marks - Page 4)**

Chapter 3: Energy Principles + Approximate methods

Repeated Questions:

1. Castigliano's Theorems (Theory):

- **Q.** State and explain Castigliano's second theorem with example. **(WINTER 2025, 3 Marks; SUMMER 2026, 3 Marks)**
- **Q.** Write the statement and proof of Castigliano's 1st theorem. **(WINTER 2022, 3 Marks; WINTER 2024, 3 Marks)**
- **Q.** Explain Castigliano's both theorems. **(SUMMER 2022, 3 Marks OR)**
- **Q.** Write a short note on Castigliano's 2nd Theorem and discuss its uses. **(WINTER 2022, 4 Marks; WINTER 2024, 4 Marks OR)**
- **Q.** State and prove the Castigliano's 1st Theorem. **(SUMMER 2025, 3 Marks OR; SUMMER 2026, 3 Marks OR)**

2. Fictitious Load & Unit Load Method (Theory):

- **Q.** Explain fictitious load method used to solve deflection problems. **(WINTER 2022, 3 Marks; SUMMER 2023, 3 Marks; SUMMER 2025, 3 Marks)**
- **Q.** Enlist steps of unit load method to analyze indeterminate structures. **(SUMMER 2022, 4 Marks; WINTER 2023, 4 Marks; SUMMER 2025, 4 Marks)**

3. Approximate Methods (Theory):

- **Q.** Write assumptions made in cantilever method of approximate analysis. **(SUMMER 2023, 4 Marks OR; WINTER 2024, 3 Marks)**

4. Castigliano & Unit Load – Beams (Numerical):

- **Q.** Calculate the central deflection for a simply supported beam of length 'l' subjected to a concentrated load of 'w' at centre on its span using Castigliano's 1st Theorem. **(WINTER 2024, 4 Marks OR; SUMMER 2026, 4 Marks OR)**
- **Q.** Calculate the central deflection for a simply supported beam of length 'l' subjected to a udl 'w' throughout its span using Castigliano's 1st theorem. **(WINTER 2023, 4 Marks; SUMMER 2025, 4 Marks)**
- **Q.** Calculate the fixed end moment for the beam shown in Figure using Castigliano's 2nd theorem. [Diagram required – refer to the original question paper] **(WINTER 2023, 4 Marks OR; SUMMER 2025, 7 Marks OR)**

5. Castigliano & Unit Load – Frames, Bents, Arches & Trusses (Numerical):

- **Q.** For a mild steel bent of 200mm diameter as shown in Figure, find the vertical deflection at D. $E = 2\times10^5$ N/mm². [Diagram required – refer to the original question paper] **(WINTER 2023, 7 Marks; SUMMER 2025, 3 Marks OR)**
- **Q.** A steel bar bent to the shape as shown in Figure is fixed at A and carries a vertical load W at C. Calculate the vertical deflection of C. EI is constant throughout. [Diagram required – refer to the original question paper] **(WINTER 2023, 7 Marks OR; SUMMER 2025, 7 Marks OR)**

Other Important Questions:

1. Castigliano's Theorems (Theory):

- **Q.** Discuss limitations of Castigliano's 1st theorem. **(SUMMER 2023, 4 Marks OR)**
- **Q.** Discuss Castigliano's second theorem to solve an indeterminate truss. **(WINTER 2022, 7 Marks)**

2. Castigliano & Unit Load – Beams (Numerical):

- **Q.** Using Castigliano's second theorem, determine reaction at the supports as shown in Fig: 2. [Diagram required – refer to the original question paper] **(SUMMER 2026, 4 Marks)**

- **Q.** Using Castigliano's second theorem, determine reaction at prop for a propped cantilever beam as shown in Fig: 3 Also draw S.F. and B.M. diagram. [Diagram required – refer to the original question paper] **(SUMMER 2026, 7 Marks)**
- **Q.** Using Castigliano's first theorem, find deflection at B and slope at D for a cantilever beam loaded as shown in Fig: 4, Take E = 2×10^5 N/mm² and I = 3×10^8 mm⁴. [Diagram required – refer to the original question paper] **(SUMMER 2026, 4 Marks OR)**
- **Q.** Determine deflection under 60kN load for a simply supported beam shown in Fig. 5. Take E = 2×10^5 N/mm², I = 2×10^8 mm⁴. [Diagram required – refer to the original question paper] **(SUMMER 2023, 7 Marks OR)**
- **Q.** Determine the reactions at the support and draw S.F. and B.M. diagram for a beam shown in Fig.1. Use Castigliano's theorem. [Diagram required – refer to the original question paper] **(SUMMER 2022, 7 Marks)**
- **Q.** Using Castigliano's first theorem, calculate deflection at free end of cantilever beam shown in Figure: 1. Take E = 2×10^5 N/mm² and size of beam as 230×300 mm. [Diagram required – refer to the original question paper] **(WINTER 2024, 7 Marks)**
- **Q.** Determine the reactions at the supports for a propped cantilever beam of length 'l' subjected to a UDL 'w' throughout its span using principle of minimum strain energy. **(WINTER 2024, 4 Marks)**
- **Q.** Derive equation for calculation of slope at A for the beam shown in Fig.3, using Castigliano's first theorem. Consider E = 2×10^5 N/mm² and I = 3×10^8 mm⁴. [Diagram required – refer to the original question paper] **(SUMMER 2024, 4 Marks)**
- **Q.** Solve the equation written in Q.3(a) and calculate slope at A for the beam shown in Fig.3 using Castigliano's first theorem. [Diagram required – refer to the original question paper] **(SUMMER 2024, 4 Marks)**
- **Q.** Calculate deflection at C the beam shown in Fig.3 using Castigliano's first theorem. [Diagram required – refer to the original question paper] **(SUMMER 2024, 7 Marks)**

3. Castigliano & Unit Load – Frames, Bents, Arches & Trusses (Numerical):

- **Q.** Analyze the portal frame shown in Fig. 6 by Castigliano's 2nd theorem and draw bending moment diagram. [Diagram required – refer to the original question paper] **(SUMMER 2023, 7 Marks)**
- **Q.** A bent up bar of 100 mm diameter is shown in figure-1. Find vertical deflection at point D using Castigliano's first theorem. Take E = 2×10^5 N/mm². [Diagram required – refer to the original question paper] **(WINTER 2022, 7 Marks)**
- **Q.** Calculate the horizontal displacements of the end B of a semicircular arch shown in the figure-2 using Castigliano's first theorem. Take EI = 6×10^{13} Nmm². [Diagram required – refer to the original question paper] **(WINTER 2022, 7 Marks OR)**
- **Q.** Determine the horizontal deflection at A of truss as shown in Fig.4. Use unit load method. [Diagram required – refer to the original question paper] **(SUMMER 2022, 7 Marks OR)**
- **Q.** Derive the equation for calculation of horizontal deflection at B for the frame shown in Fig.4, using Castigliano's first theorem. Consider E = 2×10^5 N/mm² and I = 3×10^8 mm⁴. [Diagram required – refer to the original question paper] **(SUMMER 2024, 4 Marks OR)**
- **Q.** Solve the equation written in Q.3(a) and calculate horizontal deflection at B for the frame shown in Fig.4 using Castigliano's first theorem. [Diagram required – refer to the original question paper] **(SUMMER 2024, 4 Marks OR)**
- **Q.** Calculate vertical deflection at B for the frame shown in Fig.4 using Castigliano's first theorem. [Diagram required – refer to the original question paper] **(SUMMER 2024, 7 Marks OR)**

Chapter 4: Structure subjected to Moving loads

Repeated Questions:

1. Influence Line Concepts & Muller-Breslau Principle (Theory):

- **Q.** Define the influence line diagram and give statement of Muller Breslau principle. **(SUMMER 2022, 3 Marks; WINTER 2024, 3 Marks OR; WINTER 2025, 3 Marks)**
- **Q.** State and explain Muller Breslau principle (with appropriate sketches). **(WINTER 2022, 4 Marks OR; SUMMER 2023, 3 Marks; WINTER 2023, 4 Marks; SUMMER 2025, 4 Marks OR; SUMMER 2026, 3 Marks)**
- **Q.** Explain characteristics of influence line diagram for statically indeterminate structures. **(SUMMER 2022, 4 Marks; SUMMER 2023, 4 Marks OR; WINTER 2023, 4 Marks OR; SUMMER 2026, 4 Marks)**
- **Q.** What is influence line diagram? What is the use/significance of influence line diagram? **(SUMMER 2023, 3 Marks; WINTER 2023, 3 Marks; SUMMER 2024, 3 Marks; SUMMER 2025, 3 Marks OR)**

2. ILD for Indeterminate Beams & Frames (Numerical):

- **Q.** Draw the influence line diagram for reaction at B in the continuous beam shown in Figure 3. EI is constant throughout. [Diagram required – refer to the original question paper] **(WINTER 2023, 7 Marks OR; SUMMER 2025, 7 Marks)**
- **Q.** Draw qualitative shapes of influence lines for reactions in two bay- two storeyed fixed based portal frame. **(SUMMER 2022, 4 Marks OR)**

3. ILD for Determinate Beams & Moving Loads (Numerical):

- **Q.** Draw influence line diagrams for support reactions of a simply supported beam. **(WINTER 2022, 4 Marks; SUMMER 2023, 4 Marks; SUMMER 2025, 4 Marks OR)**
- **Q.** A simply supported beam AB has span 8 m. Draw influence lines for RA, RB, Vx and Mx for a section X at 3 m from left hand support. **(SUMMER 2022, 4 Marks; WINTER 2022, 4 Marks OR; SUMMER 2026, 4 Marks OR)**
- **Q.** Draw influence line diagrams for Va and Vb as shown in Fig: 5 / Figure: 5. [Diagram required – refer to the original question paper] **(WINTER 2022, 7 Marks OR; WINTER 2024, 7 Marks OR; SUMMER 2026, 7 Marks)**
- **Q.** A distributed load of 80 kN per metre run away occupy any position on the girder as shown in Fig. 9. Find the maximum positive and negative shear force at the section marked C. [Diagram required – refer to the original question paper] **(SUMMER 2023, 7 Marks OR; SUMMER 2025, 7 Marks)**

Other Important Questions:

1. Influence Line Concepts & Muller-Breslau Principle (Theory):

- **Q.** What is Qualitative influence line and Quantitative influence line? **(SUMMER 2022, 4 Marks OR)**

2. ILD for Indeterminate Beams & Frames (Numerical):

- **Q.** Draw the influence line for reactions Va, Vb, and Vc for the two span continuous beam having span AB = 8m and BC = 4m. Compute ordinates at 2 m interval. [Diagram required – refer to the original question paper] **(SUMMER 2022, 7 Marks)**
- **Q.** Draw influence line diagrams for the RA, RB, RC FX and MX for the beam shown in Fig.5. [Diagram required – refer to the original question paper] **(SUMMER 2024, 7 Marks)**
- **Q.** Draw influence line diagram for RA for the two span continuous beam shown in Fig.6. Calculate ordinates of ILD at 1 m interval. [Diagram required – refer to the original question paper] **(SUMMER 2024, 4 Marks OR)**

- **Q.** Draw influence line diagram for MB for the two span continuous beam shown in Fig.6. Calculate ordinates of ILD at 1 m interval. [Diagram required – refer to the original question paper] **(SUMMER 2024, 7 Marks OR)**
- **Q.** Draw only Qualitative influence line diagram for following functions of 2 span continuous beam having support reaction RA, RB and RC. The point D is located at center of right span BC (a) Influence line for RC (b) Influence line for RA (c) Influence line for shear at D (d) Influence line for bending moment at D. **(WINTER 2024, 4 Marks)**
- **Q.** Draw ILD for SF and BM at section D, 4 m from A, for a two span continuous beam as shown in Figure: 4. [Diagram required – refer to the original question paper] **(WINTER 2024, 7 Marks)**

3. ILD for Determinate Beams & Moving Loads (Numerical):

- **Q.** Draw the influence line for shear force and bending moment for a point 3 m from left support and find maximum values of shear force and bending moment for a beam shown in Fig. 4. [Diagram required – refer to the original question paper] **(SUMMER 2023, 7 Marks)**
- **Q.** Two wheel loads, 50 kN and 150 kN spaced 2 m move on a simply supported girder of 12 m long. Determine the values of maximum positive and negative shear force at a section 3 m from the left end. Any wheel load can lead the other. **(WINTER 2025, 4 Marks)**
- **Q.** Two wheel loads of 120kN and 80kN spaced 2m apart moves on the span of simple supported girder 16m long. Determine the maximum bending moment at section 6m from the left end. Any wheel load can lead the other. **(WINTER 2025, 4 Marks OR)**
- **Q.** A udl of 50 kN/m, 5 m long, crosses a girder of 25 m simply supported span. Calculate the maximum shear force and bending moment at a section 6 m from left hand support. **(SUMMER 2024, 4 Marks)**
- **Q.** A simply supported beam AB has span 6m. Draw influence lines for RA, RB, Vx and Mx for a section X at 2m from left hand support. **(WINTER 2024, 4 Marks OR)**

Chapter 5: Computer Applications in Structural Engg. (for Laboratory only)

Repeated Questions:

None identified.

Other Important Questions:

None identified.

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