(b) Analyze the frame as shown in Fig. Q 15(b) below by stiffness method.

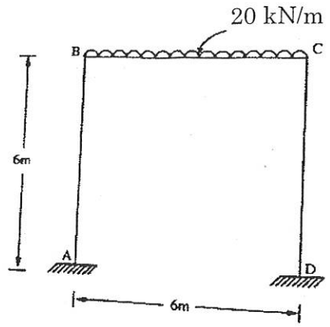
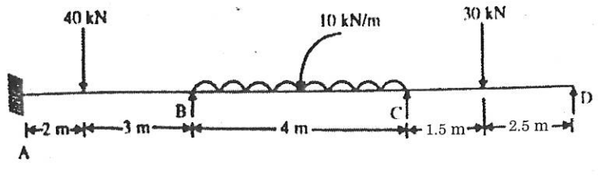


Fig. Q 15(b)

PART C — (1 × 15 = 15 marks)

16. (a) Analyze the continuous beam as shown in Fig. Q 16(a) below by the method of moment distribution. Sketch the bending moment and shear force diagrams.



EI = Constant

Fig. Q 16(a)

Or

(b) A continuous beam ABCD, 20 m long is simply supported at its ends and is propped at the same level at B and C and it is loaded as shown in Fig. Q 16(b) below. If support B is sinks by 10 mm, analyze the beam by moment distribution method and sketch the bending moment diagram. Take $E = 2.1 \times 10^5$ N/mm^2 and $I = 85 \times 10^5$ mm^4.

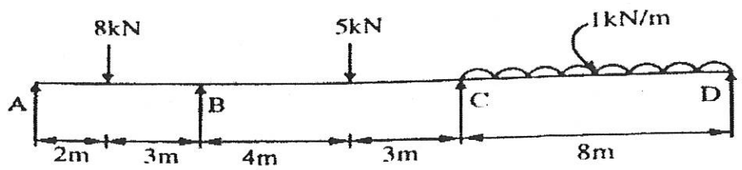


Fig. Q 16(b)

04/01/2023 - FN

Reg. No. :

Question Paper Code : 90330

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Fifth Semester

Civil Engineering

CE 8502 — STRUCTURAL ANALYSIS — I

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State and explain the principle of virtual work.
2. Write down the Castigliano's first theorem.
3. What are the assumptions made in slope-deflection method?
4. Explain the use of slope deflection method.
5. Differentiate between distribution factors and carry over factor.
6. Define point of contra flexure with an example.
7. What are the different methods of analysis of indeterminate structures?
8. What are the requirements to be satisfied while analyzing a structure?
9. Write the element stiffness for a truss element.
10. What is the basic aim of the stiffness method?

PART B — (5 × 13 = 65 marks)

11. (a) Analyze the continuous beam loaded as shown in Fig. Q 11(a) below by the strain energy method. EI is constant.

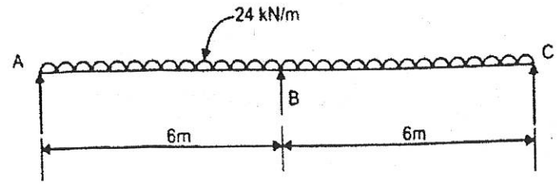


Fig. Q 11(a)

Or

(b) The simple portal frame is shown in Fig. Q 11(b) below is asymmetrically loaded. EI is constant. Analyze the frame by the strain energy method. Sketch the bending moment diagram.

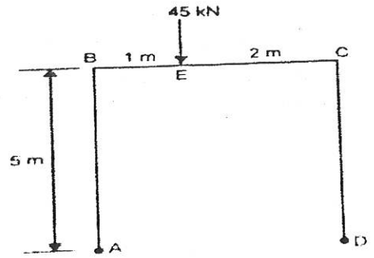


Fig. Q 11(b)

12. (a) Analyze the continuous beam loaded as shown in Fig. Q 12(a) below by the slope deflection method, Sketch the bending moment and shear force diagrams.

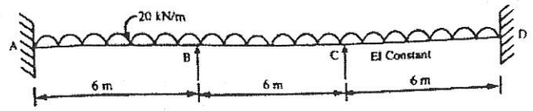


Fig. Q 12(a)

Or

(b) Analyze the portal frame loaded as shown in Fig. Q 12(b) below by the slope deflection method and sketch the bending moment and shear force diagrams.

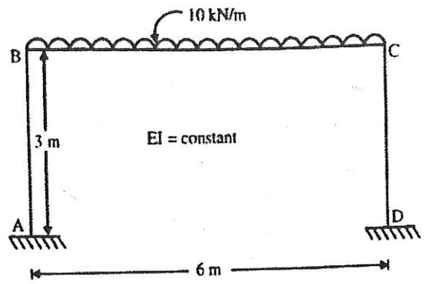


Fig. Q 12(b)

13. (a) Analyze the continuous beam loaded as shown in Fig. Q 13(a) below, by the moment distribution method. Sketch the bending moment and shear force diagrams.

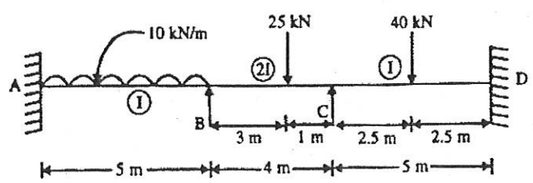


Fig. Q 13(a)

Or

(b) Analyze the portal frame as shown in Fig. Q 13(b) by the moment distribution method and sketch the BMD and SFD.

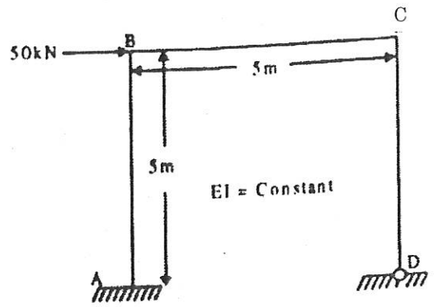


Fig. Q 13(b)

14. (a) Analyze the continuous beam as shown in Fig. Q 14(a) below by flexibility method.

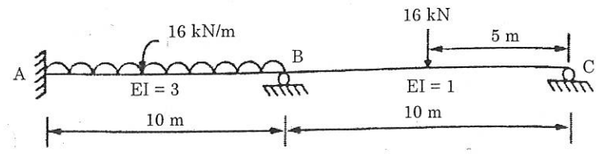


Fig. Q 14(a)

Or

(b) Analyze the continuous beam as shown in Fig. Q 14(b) below by the flexibility method and draw the bending moment diagram.

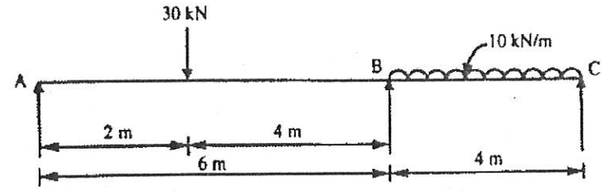


Fig. Q 14(b)

15. (a) Analyze the continuous beam as shown in Fig. Q 15(a) below by stiffness method. Draw the bending moment diagram.

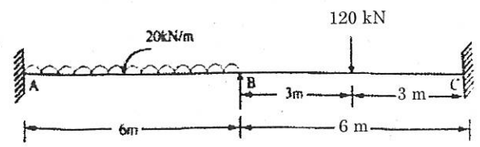


Fig. Q 15(a)

Or