

Reg. No. :

Question Paper Code : 50343

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

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. List the methods available for analysis of indeterminate trusses.
2. Define the term internal redundancy.
3. Write the slope deflection equation for a two span continuous beam.
4. When a frame is considered to undergo sway?
5. Define carryover factor.
6. Define distribution factor.
7. What do you mean by translation?
8. Define Joint rotation.
9. Define the term stiffness of a member.
10. List the properties of the stiffness matrix.

PART B — (5 × 13 = 65 marks)

11. (a) Determine the forces in the member of the structure as shown in figure Q.11(a) below by strain energy principle.

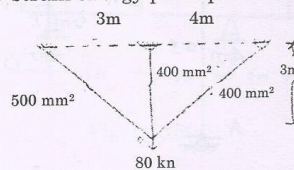


Fig. Q. 11(a)

Or

- (b) A portal frame ABCD is hinged at A and D and rigid points B and C. The frame is loaded as shown in fig Q. 11(b) below. Analyze the frame using strain energy method.

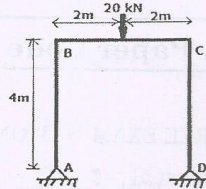


Fig. Q. 11(b)

12. (a) Analyze the beam loaded as shown in fig below by slope deflection method and draw the BMD. EI is constant throughout the length of the beam.

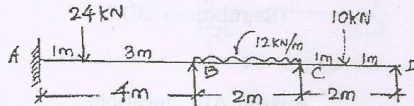


Fig. Q. 12(a)

Or

- (b) Analyze the frame by using slope deflection method for the fig shown below and draw the BMD.

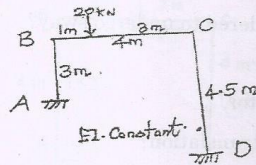


Fig. Q. 12(b)

13. (a) Analyze a portal frame shown in figure below using moment distribution method.

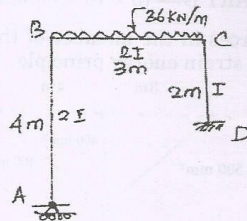


Fig. Q. 13(a)

Or

- (b) Analyze a portal frame structure by the moment distribution system as shown in the figure and draw a bending moment diagram.

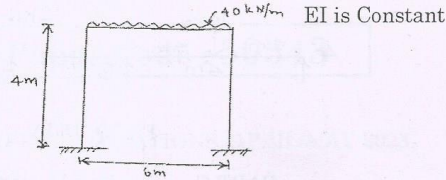


Fig. Q. 13(b)

14. (a) Analyze the continuous beam ABC as shown in the following figure by the flexibility matrix method and draw the bending moment diagram

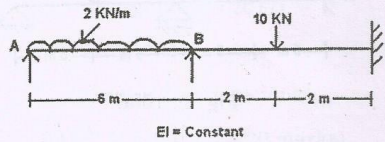


Fig. Q. 14(a)

Or

- (b) Analyze the continuous beam shown in the following figure by the flexibility matrix method.

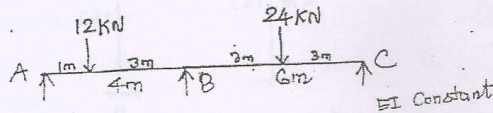


Fig. Q. 14(b)

15. (a) Analyze the beam using stiffness method as shown in the following figure

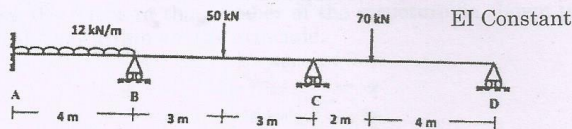


Fig. Q. 15(a)

Or

- (b) Analyze the beam as shown in the following figure by using stiffness method and draw the BMD.

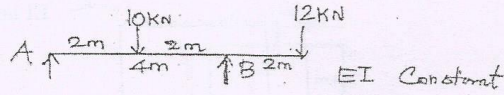


Fig. Q. 15(b)

PART C — (1 × 15 = 15 marks)

16. (a) Analyze the continuous beam ABC as shown in fig below using the flexibility matrix method and also draw the bending moment diagram.

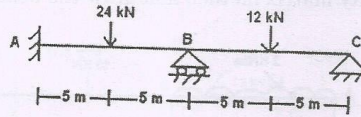


Fig. Q. 16(a)

Or

- (b) Analyze the portal frame ABCD shown in the figure using flexibility matrix method and also draw the bending moment diagram.

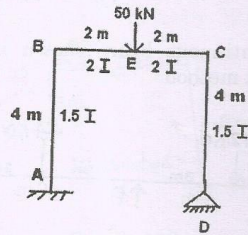


Fig. Q. 16(b)