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Question Paper Code: 31514

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2016

Fifth Semester

Civil Engineering

01UCE504 – STRUCTURAL ANALYSIS - I

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

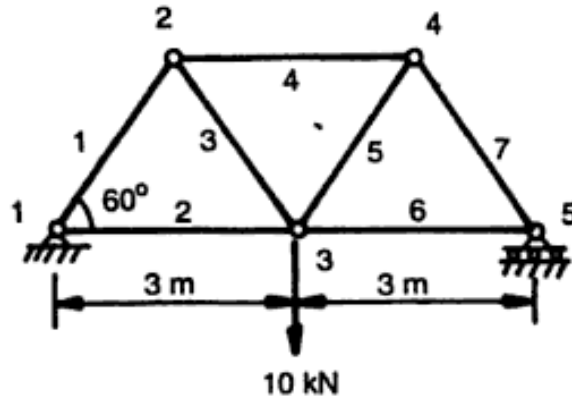
Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. State principle of virtual displacement.
2. What is Williot digram?
3. Write down the general slope-deflection equations and state what each term represents?
4. What are the assumptions made in slope-deflection method?
5. Define Carry over factor.
6. Define the term 'sway'.
7. Define degree of indeterminacy.
8. Differentiate between determinate and indeterminate structures.
9. What are the basic unknowns in stiffness matrix method?
10. Write the element stiffness for a truss element.

PART - B (5 x 16 = 80 Marks)

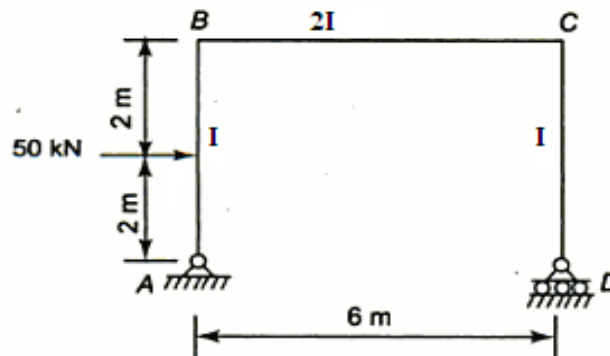
11. (a) Determine the vertical and horizontal deflection of joint 4 for the truss shown in below figure. $L=3\text{ m}$, $A= 500 \times 10^{-6}\text{ m}^2$ and $E = 200 \times 10^6\text{ kN/m}^2$ are constant for all members.



(16)

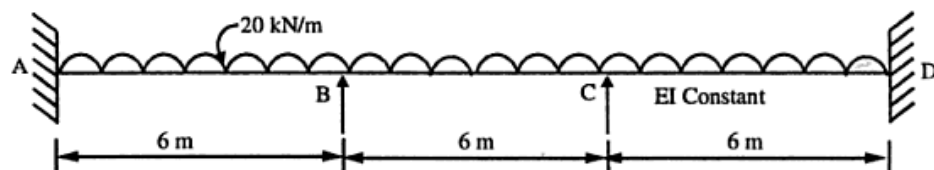
Or

- (b) Determine horizontal displacement at support D for the frame shown in below figure. Take $E=200\text{ kN/m}^2$ and $I=300 \times 10^{-6}\text{ m}^4$.



(16)

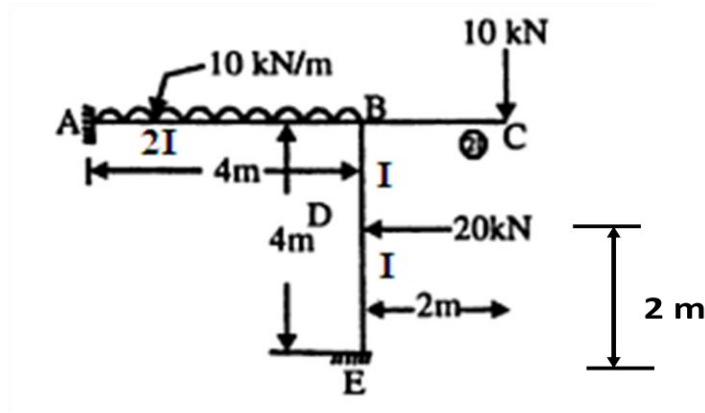
12. (a) Analyze the beam shown in below figure by slope deflection method and draw the bending moment diagram.



(16)

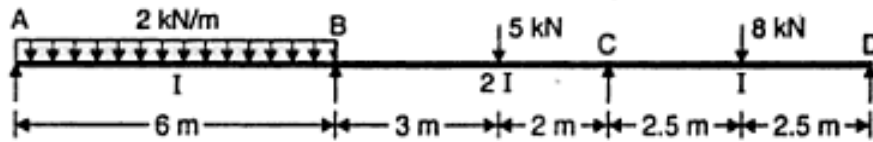
Or

(b) Analyze the frame shown in below figure by slope deflection method and draw the BMD.



(16)

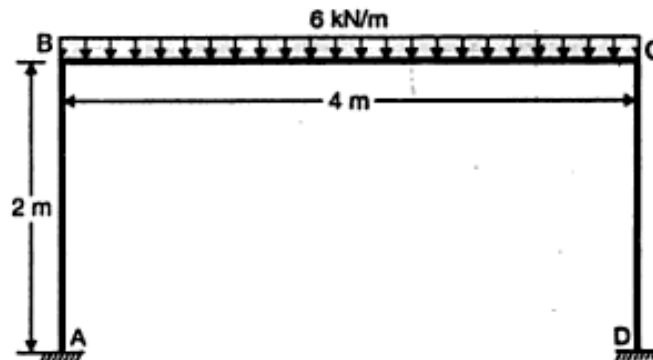
13. (a) Analyze the frame shown in below figure by moment distribution method and draw the BMD.



(16)

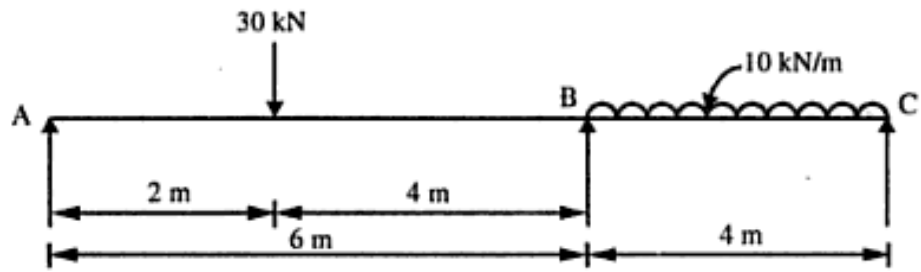
Or

(b) Analyze the portal frame shown in below figure by moment distribution method and draw the BMD.



(16)

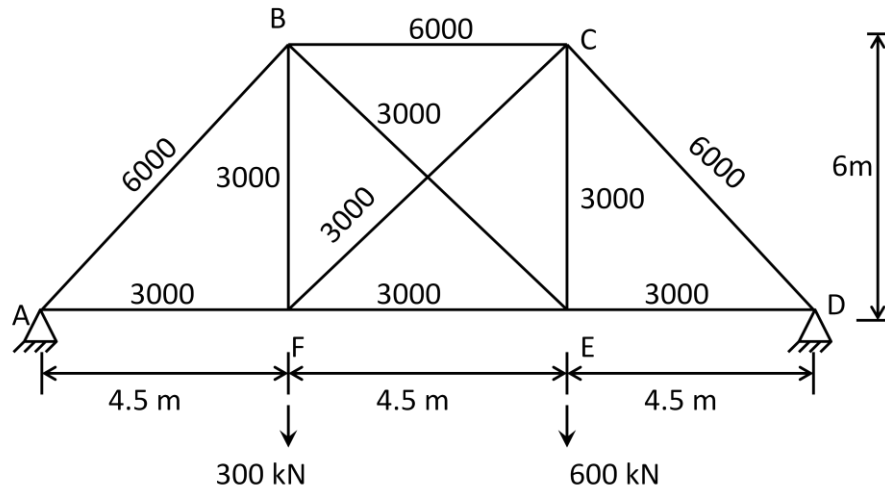
14. (a) Analyze the continuous beam shown in below figure by flexibility method and draw bending moment diagram.



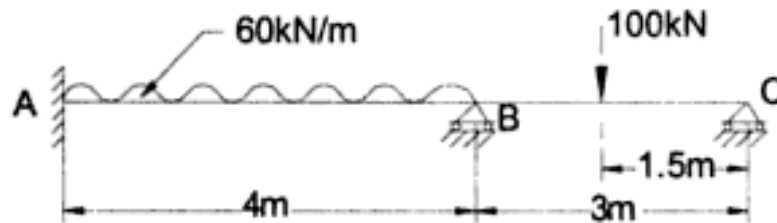
(16)

Or

- (b) Analyze the pin jointed frame shown in below figure by flexible matrix method. The numbers in the parenthesis are cross sectional areas of the members in mm^2 . (16)



15. (a) Analyze the continuous beam shown in below figure by stiffness matrix method. Take EI as constant throughout. (16)



Or

- (b) Write down the steps in analyzing a beam or frame using matrix stiffness method. (16)