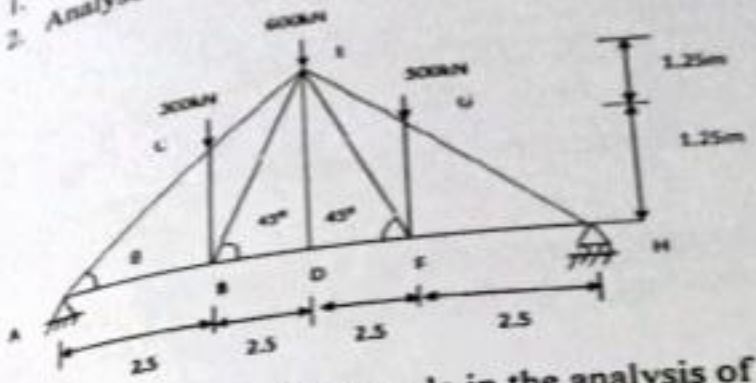
STRUCTURAL ANALYSIS

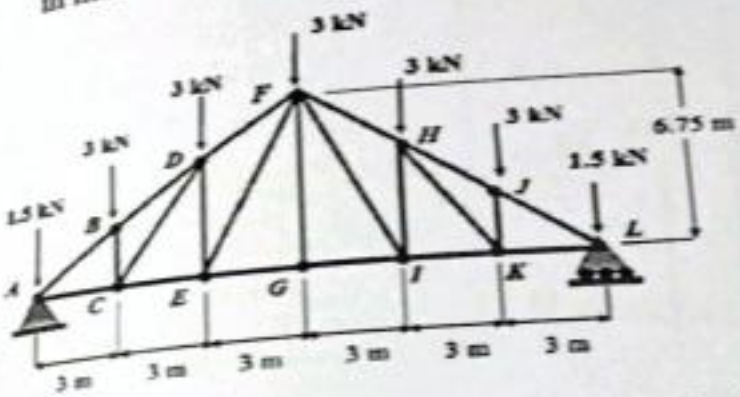
QUESTION BANK

Module I

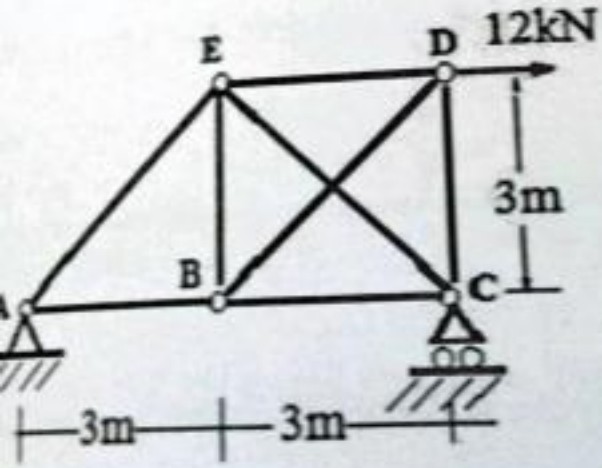
1. Explain the method of sections
2. Analyse the pin jointed truss as shown by the method of joints



3. State the assumptions made in the analysis of plane trusses.
4. A Pratt roof truss is loaded as shown. Using the method of sections, determine the forces in members FH and GI

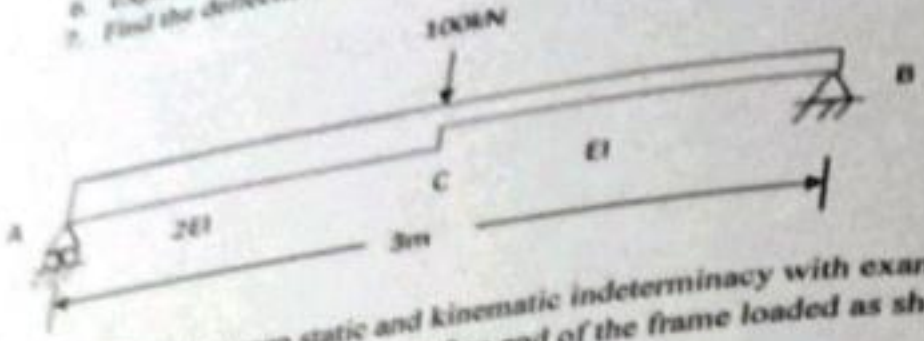


5. Determine the force in the member BE. Axial rigidity AE of all members is const

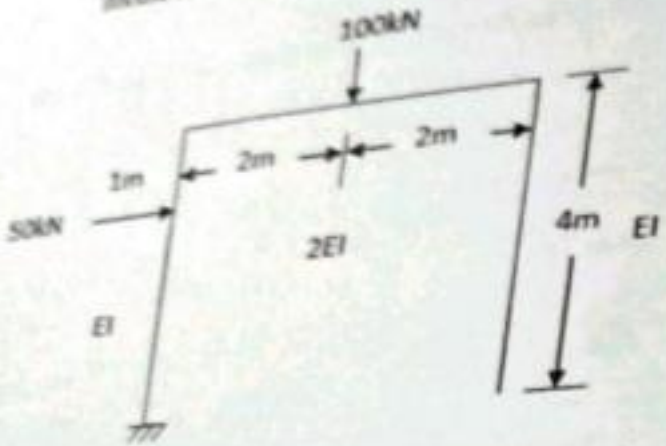


Module 2

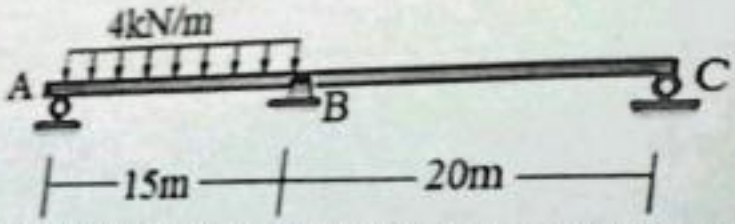
6. Explain Maxwell's law of reciprocal deflection
7. Find the deflection at C of the beam as shown in figure by strain energy method



8. Differentiate between static and kinematic indeterminacy with examples
9. Find the vertical deflection at the free end of the frame loaded as shown by unit load method

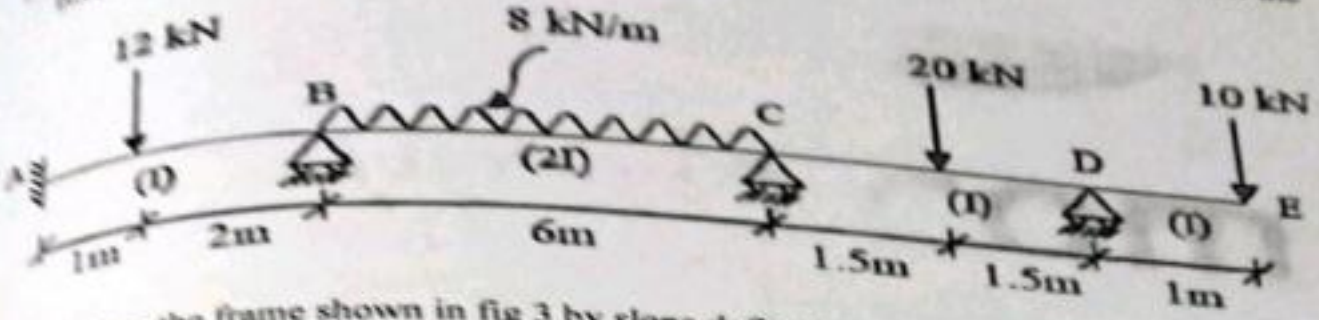


10. How will you account the effect of lack of fit and temperature changes in the analysis of trusses
11. Analyse the beam shown using consistent deformation method and draw the SFD and BMD

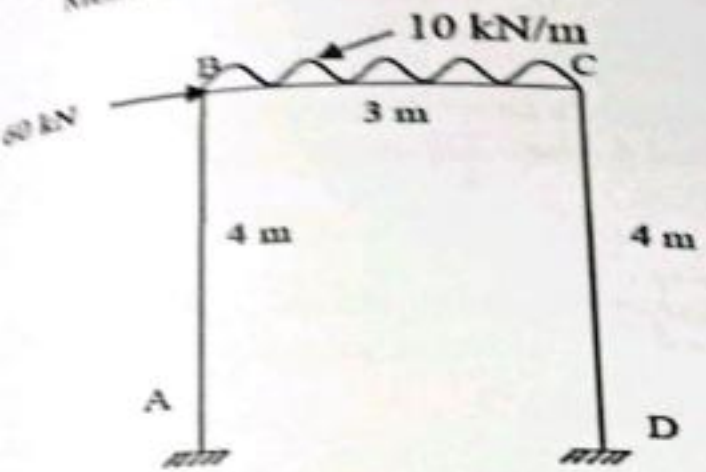


12. Analyse the single jointed truss as shown in figure by the method of consistent deformation. AE is constant for all the members

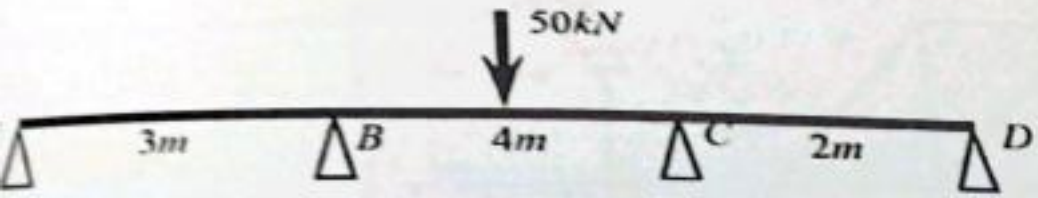
...8. Explain how the effect of settlement of support is taken care of while analyzing the Continuous beams using slope deflection method.
...9. Analyse the continuous beam shown in fig.2 by slope deflection method and draw the BMD.



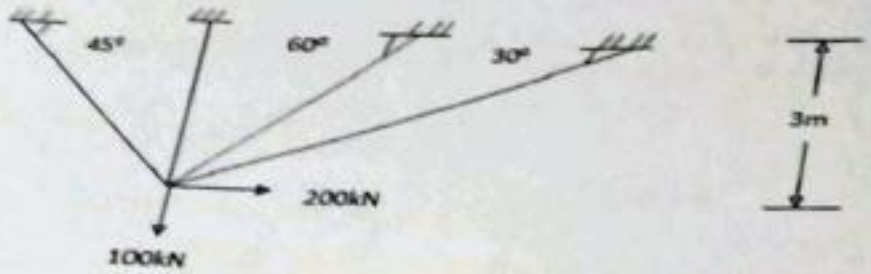
20. Analyse the frame shown in fig 3 by slope deflection method and draw the BMD. Moment of inertia for all the members is same.



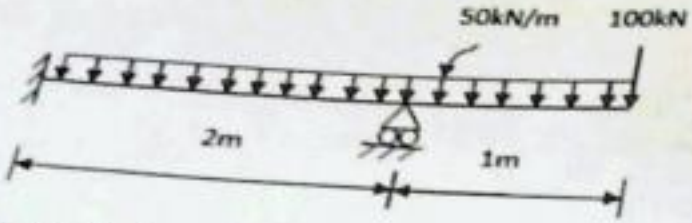
21. Find the bending moments at B and C of the continuous beam shown in Fig.1,using slope deflection method



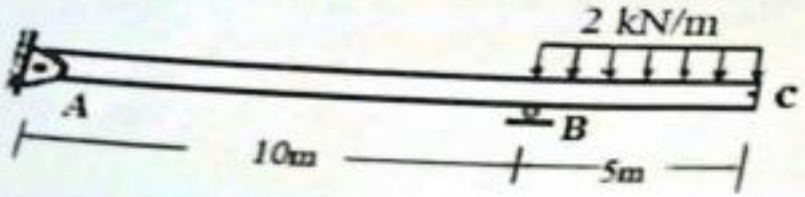
2. Analyse the 2D frame shown in Fig. 2, using slope deflection method. Draw BMD.



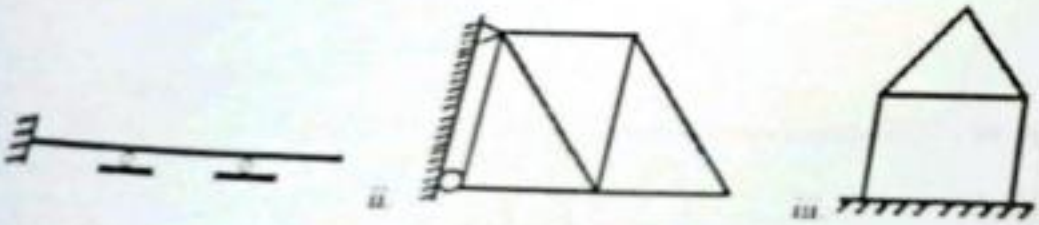
13. Analyse the propped cantilever by consistent deformation method. EI constant

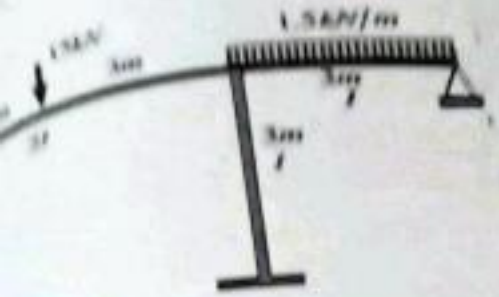


14. Obtain the expression for strain energy due to bending in a flexural member.
15. Determine the vertical deflection at C using unit load method. Assume EI constant.

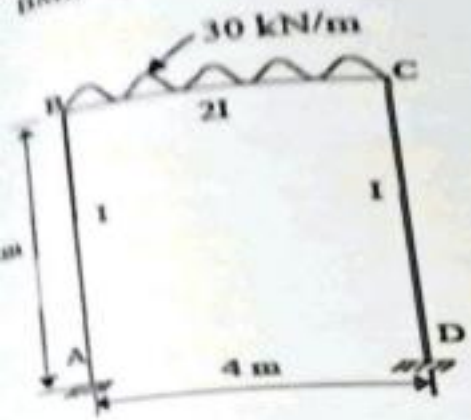


16. State and prove Maxwell's law of reciprocal deflections.
17. Determine the static and kinematic indeterminacies of the structures shown





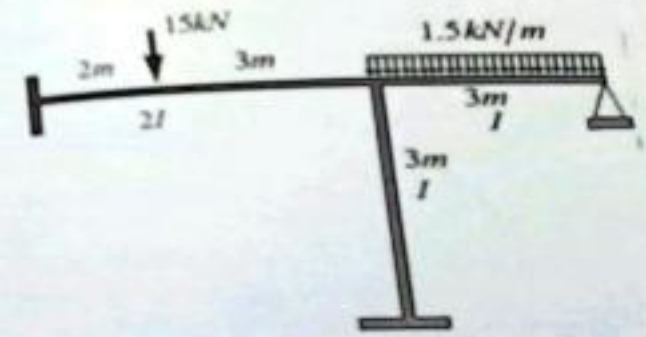
Analyse the rigid frame shown in fig.4 by moment distribution method and draw the BMD



24. List out the situations that causes sway in portal frames with neat sketches
25. Define the following terms:

Carry over moment ii) Carry over factor iii) distribution factor

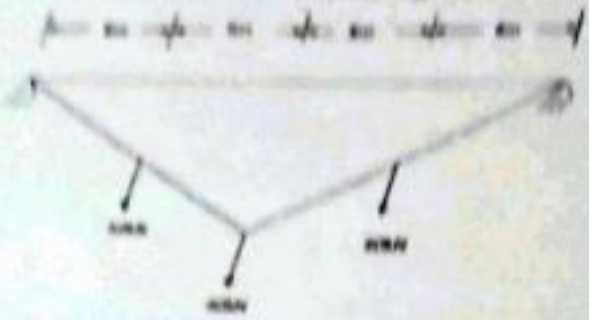
26. Analyse the 2D frame shown in Fig. 2, using moment distribution method. Draw BMD.



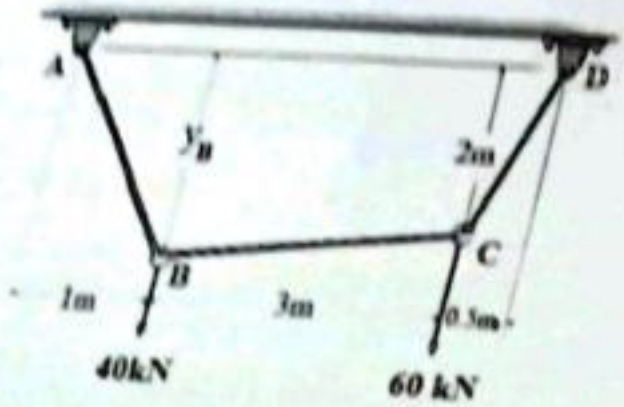
29. Write short notes on suspension bridges

28. Show that a cable subjected to uniformly distributed load w/unit horizontal length the shape of the cable is a parabola

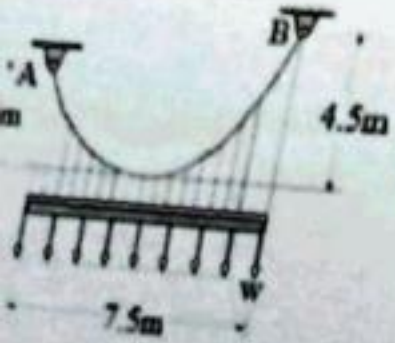
30. A light cable is supported at two points 30m apart which are at the same level. The cable supports three concentrated loads as shown. The deflection at first point is 1m. Determine the tension in the different segments and total length of the cable.



30. Cable ABCD supports the loading shown. Determine the maximum tension in the cable and sag of point B.



31. The cable supports the uniform load w=8kN/m. Determine the tension in the cable at each support A and B



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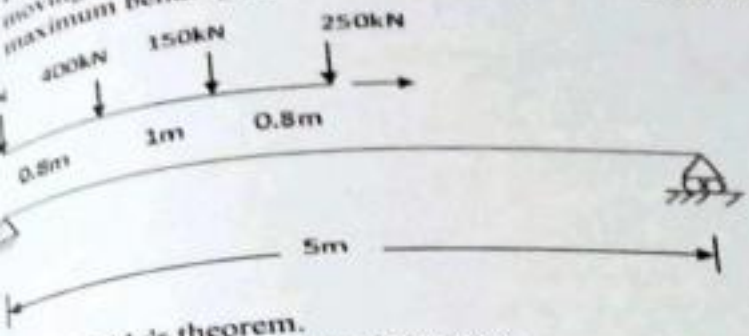
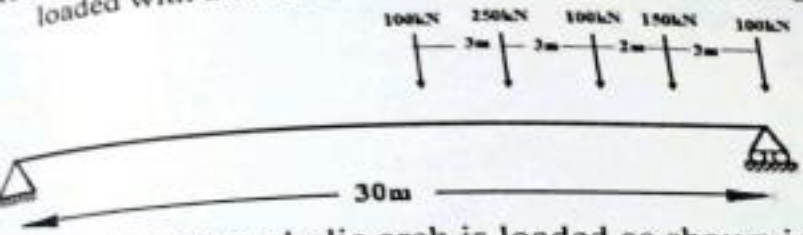
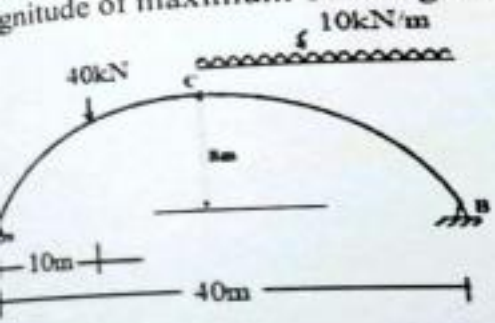
5
What do you meant by influence line diagram? What are the uses of influence line diagrams?
Draw the influence line diagram for shear force at any section of an overhanging beam of span 'L' with equal overhang on each side.
For the simply supported beam AB of span 5m subjected to a train of concentrated loads moving from left to right as shown in Figure. Using influence lines find the absolute maximum bending moment and the equivalent uniformly distributed load.



State Eddy's theorem.
What are the advantages of arches?
Draw the bending moment diagram for a three-hinged symmetric parabolic arch of span 50m rise 10m subjected to a concentrated load of 50 kN acting at 8m from left support and a uniformly distributed load of 25 kN/m acting over the right half portion.
Show that the parabolic shape is a funicular shape for a three-hinged arch subjected to UDL for the entire span.
Draw the influence lines for horizontal thrust 'H', Moment at any section and radial shear for a three-hinged arch of span L and rise 'h'.
Compute the absolute maximum bending moment for the beam having span of 30 m and loaded with a series of concentrated loads moving across the span as shown in the figure.



A three-hinged parabolic arch is loaded as shown in figure. Calculate the location and magnitude of maximum bending moment in the arch. Draw bending moment diagram.



41. A three-hinged symmetric parabolic arch has a horizontal span L and central rise h. It is subjected to a uniformly distributed load of w per unit length along the span. Show that the shear force and bending moment at any section normal to the profile of arch is zero. Find also the normal thrust at this section.