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Total No. of Pages : 03

Total No. of Questions : 08

M.Tech (SE) (Sem.-1)

ADVANCED STRUCTURAL ANALYSIS

Subject Code : CE-505

Paper ID : [E0845]

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1. a) Discuss the relative conditioning of the flexibility and stiffness matrices and its effect on the accuracy of the solution. (5)
 b) What does the stiffness of a member indicate? Two rods, one of steel and other of aluminium, have the same length and cross section. Will their stiffness be the same? (5)
 c) Develop the flexibility matrix for simply supported beam with reference to the coordinates shown in figure (1). Does the stiffness matrix exist? (10)



Fig. 1

2. Analyse the continuous beam shown in figure (2) by force method. The beam has an internal hinge at B. (20)

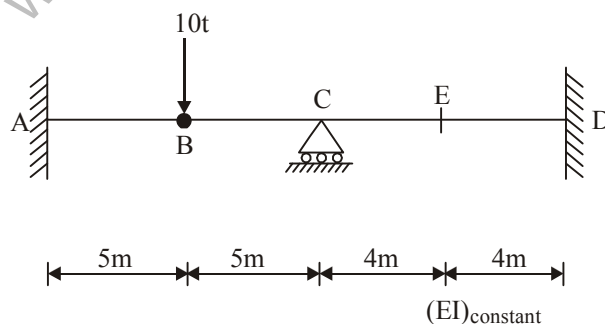


Fig. 2

3. Analyse the truss member shown in figure (3) by using element approach of displacement method. (20)

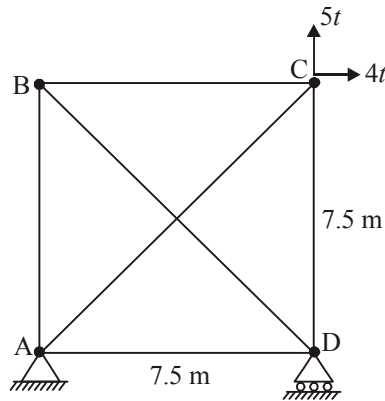


Fig. 3

4. a) Explain procedure for analysis of curved beam element in vertical plane deriving stiffness formulation.
b) Method of static condensation. (10×2)
5. A solid circular plate of radius 0.35 m with its outer edge completely restrained is subjected to a pressure of 8 N/mm². If the allowable stress in the plate is limited to 90 N/mm². Determine the (a) thickness of the plate (b) maximum deflection. Consider E= 200GPa and $\nu=0.3$. (20)
6. Explain the followings :
a) Analysis of Beams on Elastic foundation.
b) Procedure for incorporating support displacements. (10×2)
7. a) What do you understand by non linear analysis of structures? (8)
b) A prismatic folded plate ABCDEF shown in figure (4) supports a total load of 1.5 kN/m². Estimate the stresses developed in the plate at mid span section if the plates BC, CD and DE are 130 mm thick and the plates AB and EF are 200 mm thick. Span of the folded plate is 8.5 m. Assume unit weight of the plate is 24 kN/m². (12)

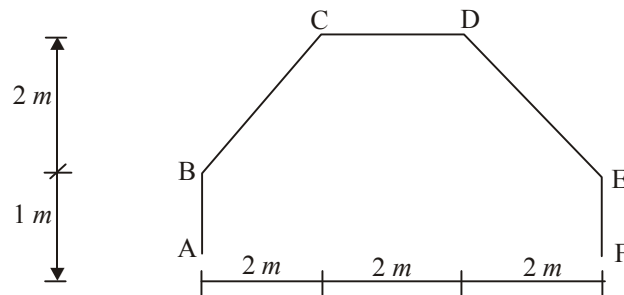


Fig. 4

8. a) What do you understand by a plastic hinge? Explain with a sketch. (8)
- b) Analyse the portal frame shown in figure (5) by using the displacement method. Hence determine the fixed end moments at support A and D. (12)

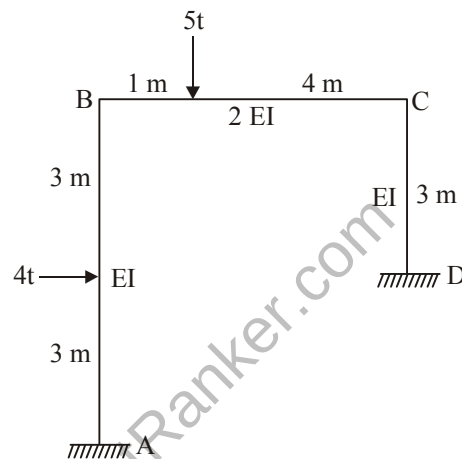


Fig. 5