R09

Code No: C2008

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH I - SEMESTER EXAMINATIONS APRIL/MAY-2012
ADVANCED STRUCTURAL ANALYSIS
(STRUCTURAL ENGINEERING)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks

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1.a) Structures may be solved by either stiffness matrix method or flexibility method. Generally stiffness matrix is preferred. Explain.

b) Distinguish between statical indeterminacy and kinematic indeterminacy.

c) Calculate the kinematic indeterminacy of the structure in fig.1.

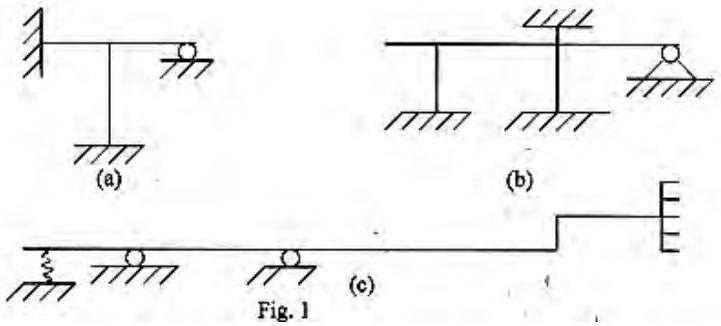

Fig. 1

2. Analyze the beam in fig 2. by flexibility method. Assume EI is same for all members. Assume stiffness of spring k at support 2 = 10000KN/m. EI = 20000KN/m^2.

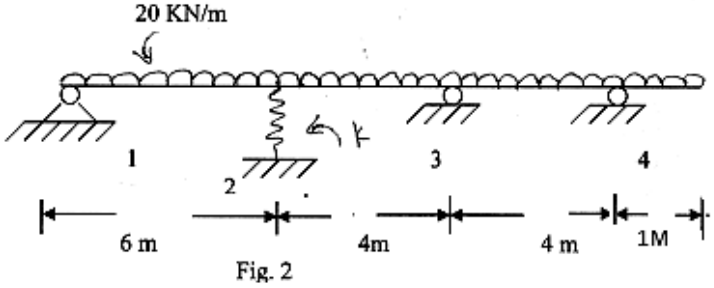

Fig. 2

3. Determine the element stiffness matrix for the beam element shown in fig.3.

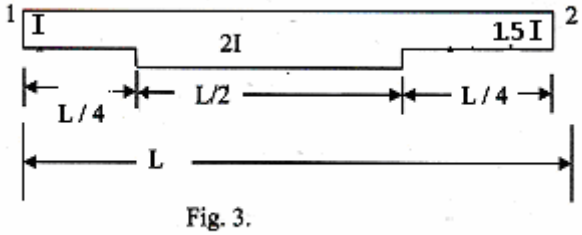

Fig. 3.

4. Determine the global stiffness matrix for the structure in fig.4. Neglect axial deformations in columns. Assume horizontal displacements of node 1 and node 2 as same and assume equal horizontal displacement at nodes 3, 4, and 5.

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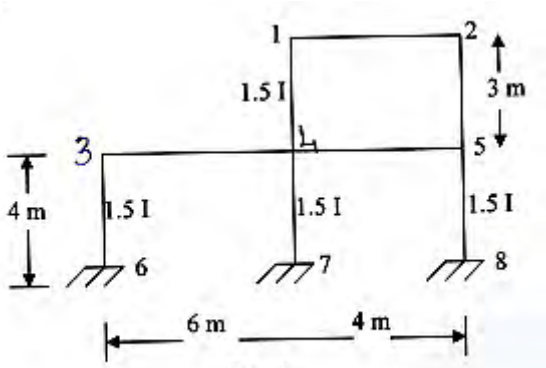

Fig . 4

5.a) Derive the expression for transformation of stiffness matrix from local to global coordinates.

b) Explain the significance of proper-node numbering when analyzing by matrix methods.

6.a) What is a shear wall. Discuss the structural behavior of a frame with and without a shear wall.

b) Explain briefly factors influence the selection of shear walls and suitability of framed-shear walls and coupled-shear walls?

7. Generate the stiffness matrix and obtain the lead vector for the gable frame shown in fig 5.

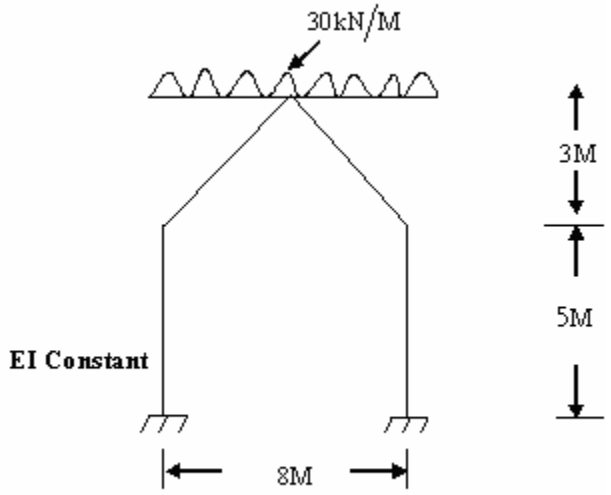

Fig. 5

8. Write short notes on.

a) Sub structure analysis

b) Static Condensation

c) Band Matrix and semi Band width.

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