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Total Number of Pages : 02

M.TECH

AR-18

M.TECH 1<sup>ST</sup> SEMESTER EXAMINATIONS(BACK), NOV/DEC 2019

SE, MSEPC1030

MATRIX METHODS OF ANALYSIS OF STRUCTURES

Time: 3 Hours

Max Marks : 70

The figures in the right hand margin indicate marks.

**PART-A****(10 X 2=20 MARKS)**

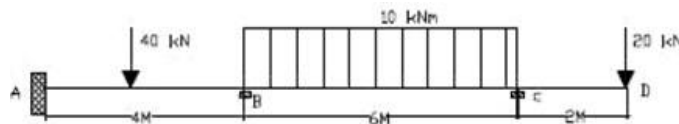
1. Answer the following questions.

- Stiffness matrix is always symmetric. Comment.
- How the structures are classified?
- What are the basic unknowns in stiffness method?
- What do you mean by degree of freedom?
- Define equivalent joint load in matrix method of analysis.
- What are the levels of structural analysis?
- What do you mean by response of a structure?
- What is the general method of matrix analysis?
- State kinematic indeterminacy.
- Differentiate between displacement and deformation.

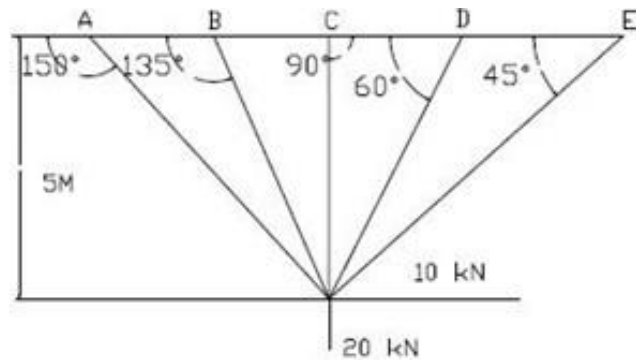
**PART-B****(5 X 10=50 MARKS)**

Answer any five questions from the following.

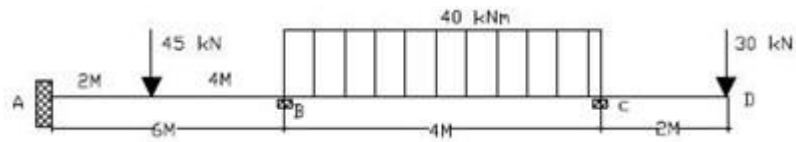
- (a) Analyze the continuous beam as shown in fig. for the following conditions.
  - All the supports are rigid
  - B shrinks by 100 mm under load
  - $E = 200 \times 10^6 \text{ N/mm}^2$
  - $I = 100 \times 10^3 \text{ mm}^4$



- Draw shear force and bending moment diagram.
- (a) Solve the truss by any method of matrix  
 $E = 2000 \text{ kN/cm}^2$   
 $A = 20 \text{ cm}^2$



- (b) Enumerate the basic steps in flexibility method.
4. (a) Calculate the degree of various type of indeterminacy.  
(b) Discuss on Principle of superposition.
5. (a) Analyze the continuous beam having three spans each of 3m length by stiffness matrix method. Extreme ends are fixed and intermediate supports are roller supports. The beam carries 20 kN concentrated loads at mid-point of each span.  $EI = \text{constant}$ .  
(b) Draw Shear Force Diagram and Bending Moment Diagram.
6. (a) Analyze the continuous beam as shown in fig. for the following conditions.



- (b) Draw Shear force and bending moment diagram.
7. (a) State the comparison between force method and displacement method of analysis.  
(b) What do you mean by flexibility method of matrix analysis?
8. Write Short notes on
- Unit load method.
  - Principle of superposition.