

B.E. Civil Engineering (Model Curriculum) Semester - VII  
**PCC-1-CE-701 - Structural Analysis-III**

P. Pages : 2

Time : Four Hours



**GUG/S/23/14285**

Max. Marks : 80

- Notes :
1. All questions carry equal marks.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Illustrate your answers wherever necessary with the help of neat sketches.

1. Derive the member stiffness matrix for 2 noded beam element with 2DoF per node. 16

**OR**

2. Derive the rotation transformation matrix for beam element. 16
3. Using stiffness method analyse the continuous beam as shown in fig. 1 and draw its BMD and SFD. 16

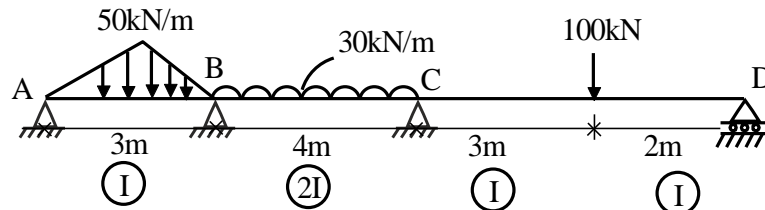


Fig. 1

**OR**

4. Using stiffness method analyse the continuous beam shown in fig. 2 evaluate the reactions at support. Draw SFD and BMD take  $EI = 5600 \text{ kN/m}^2$ . 16

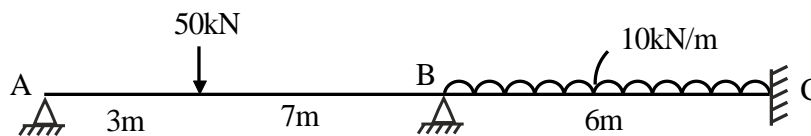


Fig. 2

5. Analyse portal frame shown in fig. 3 by stiffness matrix method Neglect axial deformation. 16

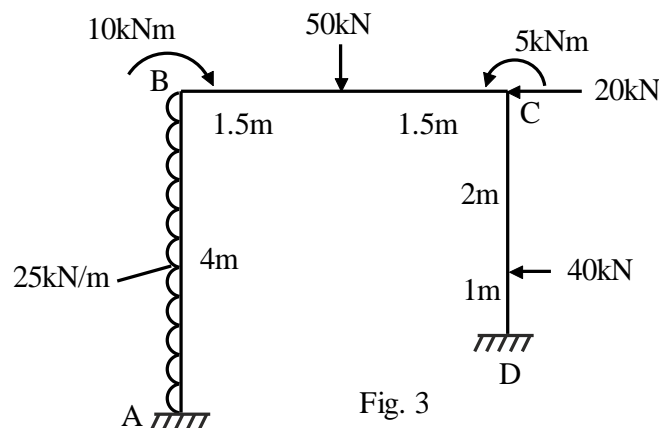


Fig. 3

**OR**

6. Determine forces in members of truss shown in fig. 4. If temperature of members falls by  $50^{\circ}\text{C}$ . Take  $\alpha = 12 \times 10^{-6} / ^{\circ}\text{C}$ ,  $E = 20000 \text{ kN/cm}^2$ ,  $A = 10 \text{ cm}^2$ . 16

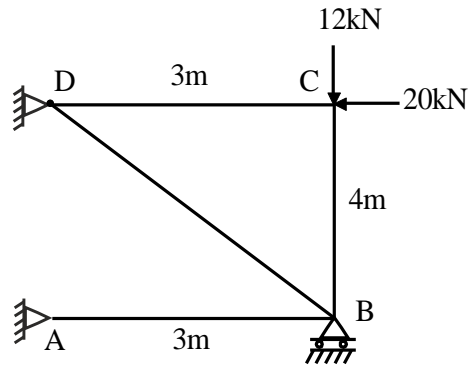


Fig. - 4

7. a) Explain clearly with example the D'Alembert principle. 8  
 b) Explain free and forced vibrations. 8

**OR**

8. a) Explain linearly elastic and linearly inelastic system with suitable example. 8  
 b) Explain SDOF system in detail. 8
9. a) Explain shape function and its use in FEM. 8  
 b) What are storage techniques. 8

**OR**

10. a) Explain the interpolation function and its use in FEM with example. 8  
 b) Explain Rayleigh Ritz method to solve the problem of two noded bar element. 8

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