

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

P. Pages : 3

Time : Four Hours



GUG/S/25/14285

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.

1. Analysis the continuous beam shown in figure 1 by stiffness matrix method. Draw bending moment diagram. (EI constant). 16

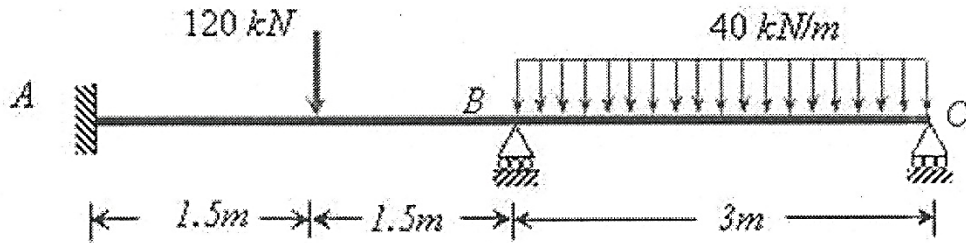


Figure 1

OR

2. Derive the member stiffness matrix for 2 noded beam element with 3 degree of freedom per node. 16

3. Analysis the continuous beam shown in figure 1 by stiffness matrix method, if the support B sink by 15 mm (EI constant) take $EI = 10000 \text{ kNm}^2$ 16

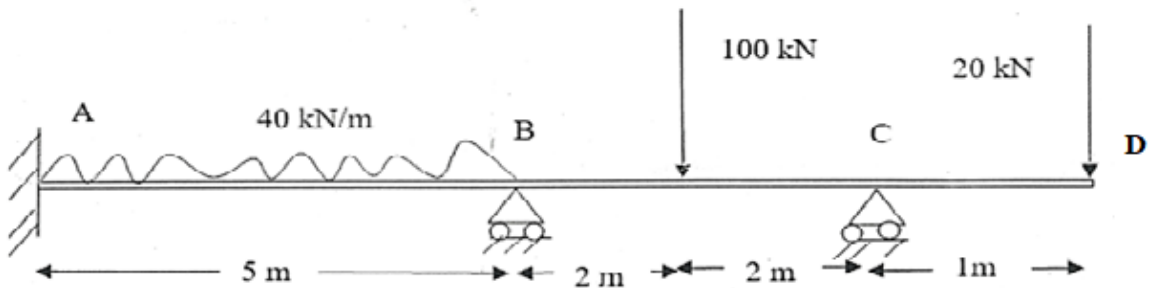


Figure 2

OR

4. Analyse the plane truss shown in figure 3. $E = 2 \times 10^9 \text{ kN/m}^2$, $A = 5 \times 10^{-4} \text{ m}^2$

16

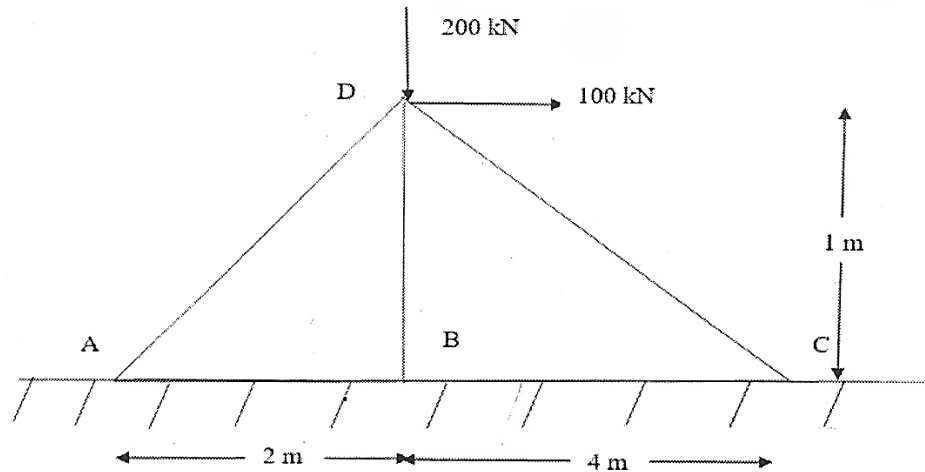


Figure - 3

5. Find force in all members of pin joined truss considering following condition

16

- Temperature of member BE increase by 45°C .
- Member BC is too short by 0.03 mm.
- Member AB is too long by 0.01 mm

Take $E = 200 \text{ kN/m}^2$, $A = 3000 \text{ mm}^2$ for all member, $\alpha = 10 \times 10^{-6} / ^\circ\text{C}$

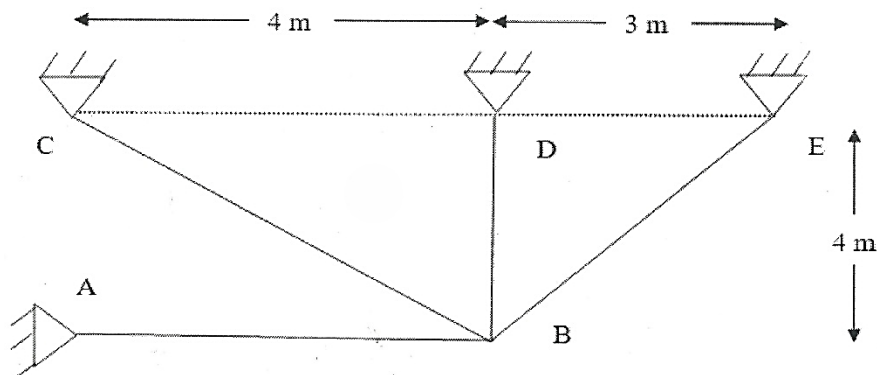


Figure - 4
OR

6. Find the global stiffness and global load vector for plane frame shown in figure

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$E = 22 \times 10^6 \text{ kN/m}^2$, $b = 300$, $d = 600 \text{ mm}$

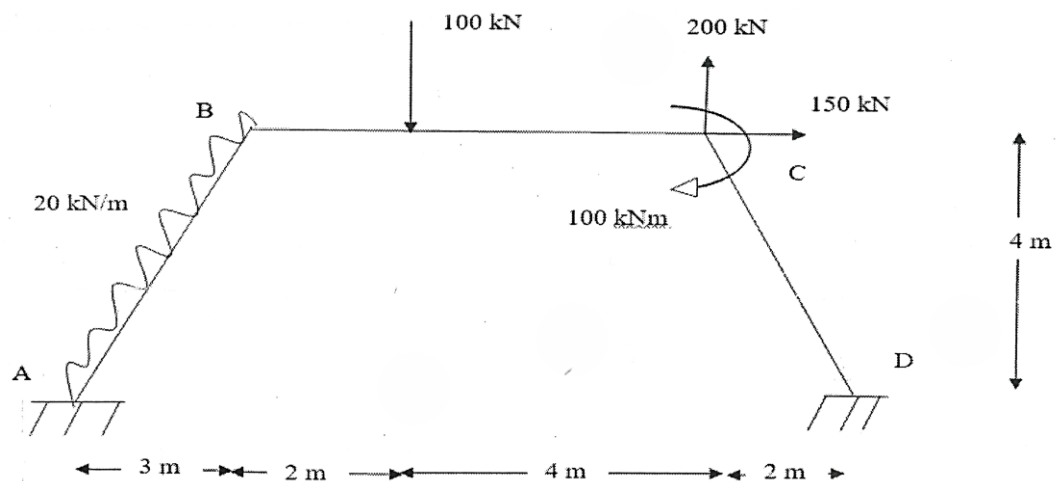


Figure 5

7.

Analyze the plane truss shown in figure 6. $E = 210 \text{ kN/m}^2$

16

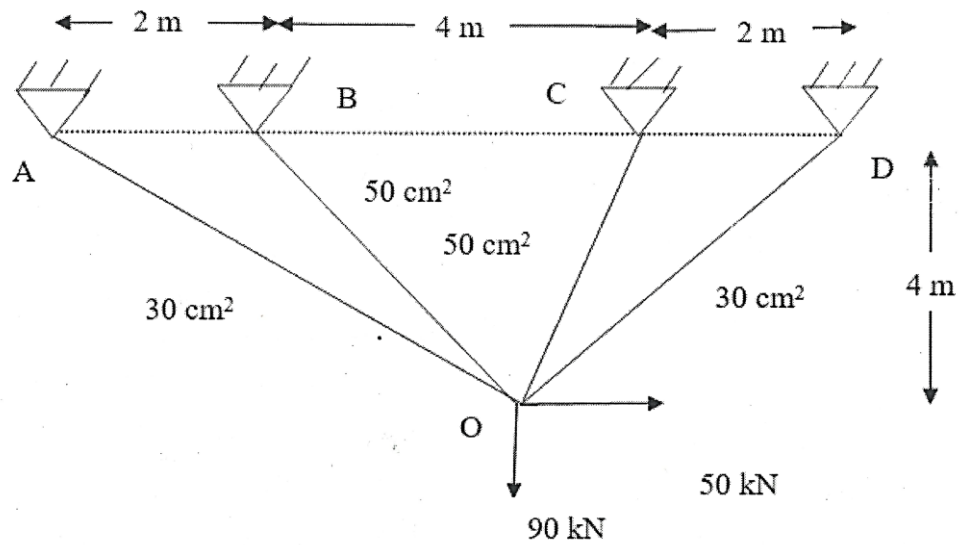


Figure 6

OR

- | | | | |
|----|----|--|---|
| 8. | a) | What is shape function and its use in finite element method. | 8 |
| | b) | Explain clearly with example D' Alembert principle. | 8 |
| 9. | a) | Explain the interpolation function and its use in FEM with suitable example. | 8 |
| | b) | What are the storage techniques. | 8 |

OR

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|-----|----|---|---|
| 10. | a) | Explain in details Rayleigh Ritz method. | 8 |
| | b) | Explain in details concept of finite element. | 8 |
