

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

P. Pages : 3

Time : Four Hours



* 2 5 5 7 *

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**

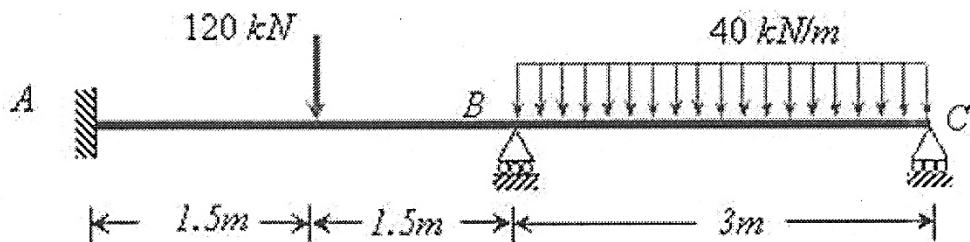


Figure 1

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**

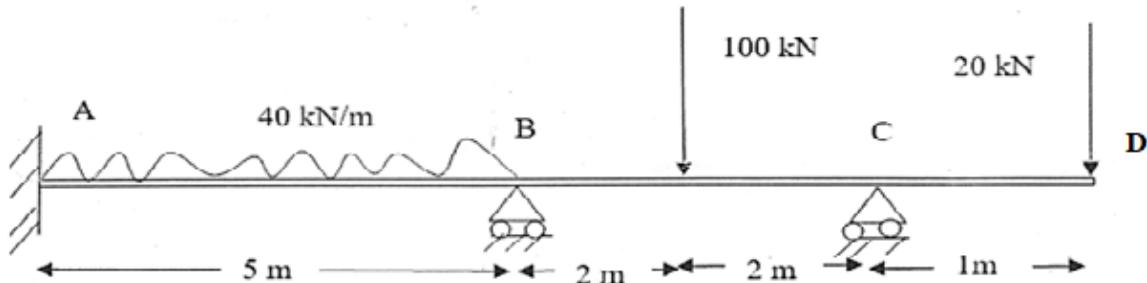


Figure 2

OR

4.

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

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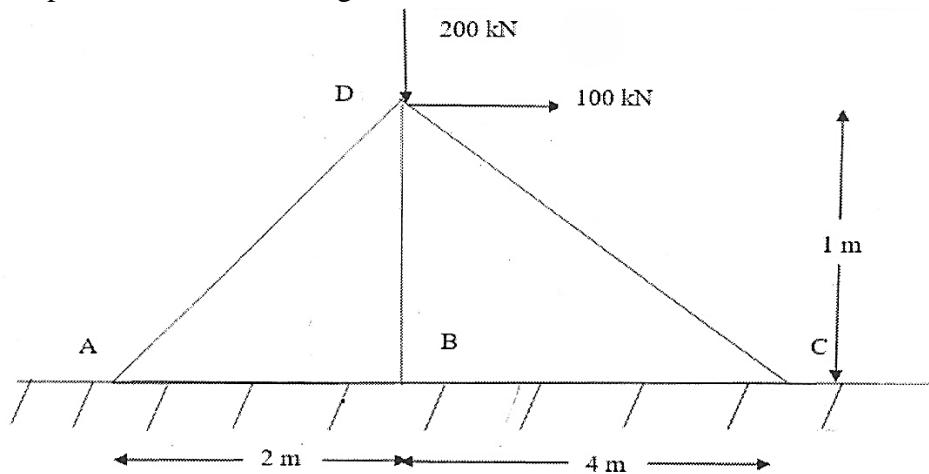


Figure - 3

5.

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

16

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

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

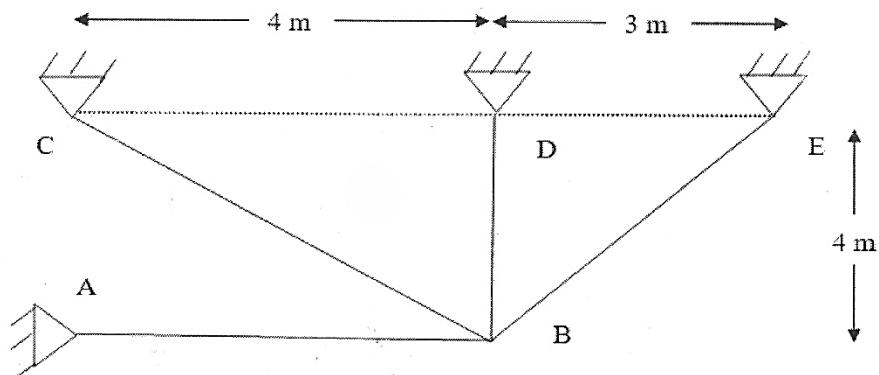


Figure - 4

OR

6.

Find the global stiffness and global load vector for plane frame shown in figure
 $E = 22 \times 10^6 \text{ kN/m}^2$, $b = 300$, $d = 600\text{mm}$

16

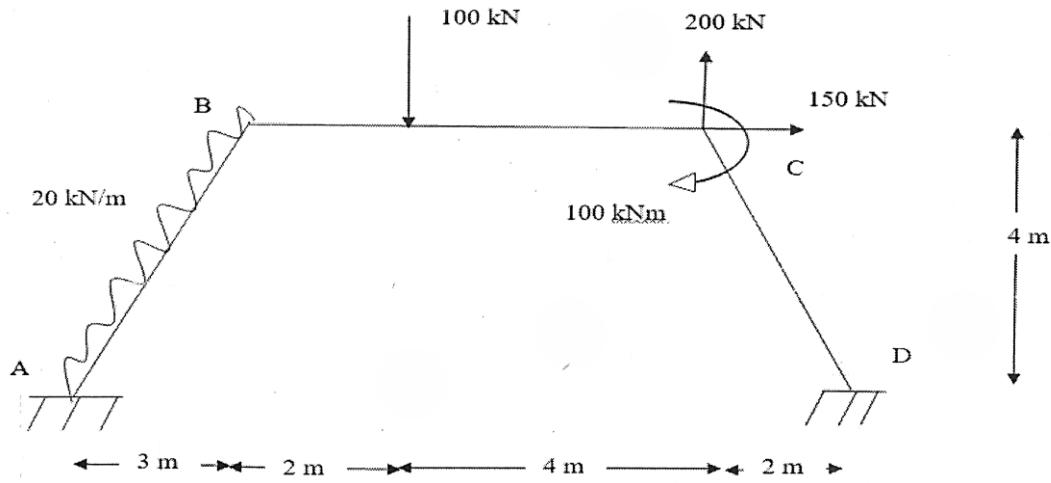
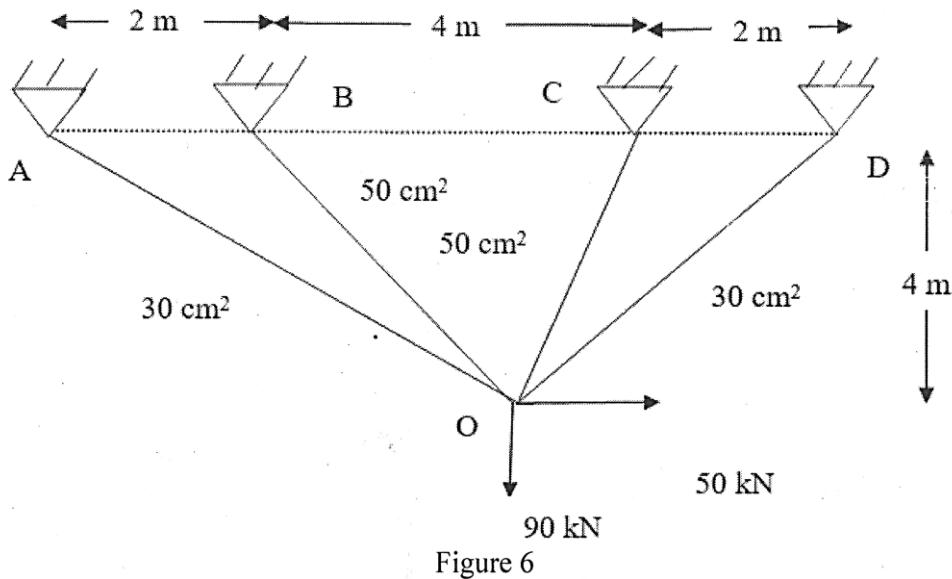


Figure 5

7.

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



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 storages techniques. 8

OR

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