B.E. (Civil Engineering) Semester Fifth (C.B.S.)

Structural Analysis - II

P. Pages : 4 **KNT/KW/16/7318**

Time : Three Hours Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data wherever necessary.
10. Use of non programmable calculator is permitted.

1. Analyse the frame shown in fig. (1) by Kanis Method and draw B. M. diagram. **14**

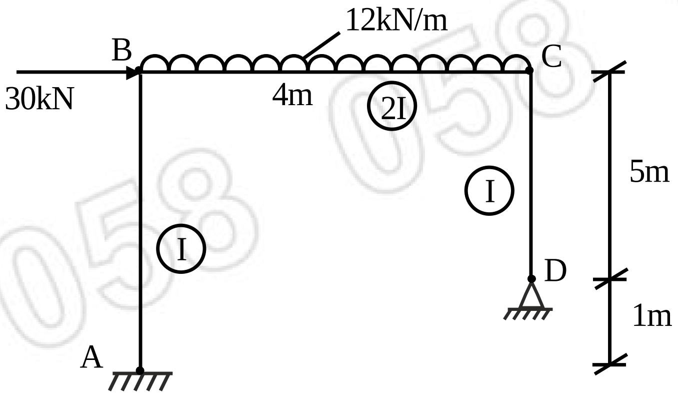


Fig. 1

OR

2. Analyse the frame shown in fig. (02) by Kanis method and draw B. M. diagram. **14**

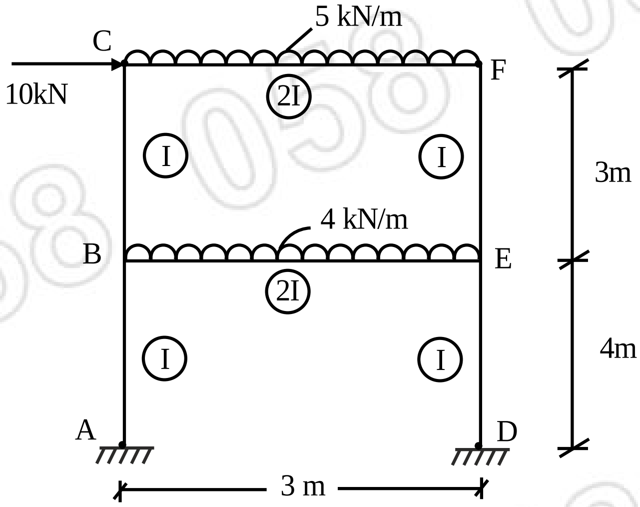
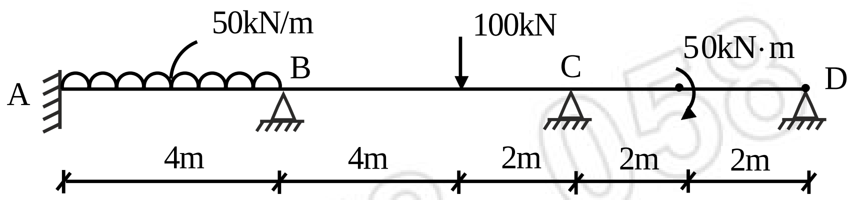


Fig. 2

3. Analyse the continuous beam by moment distribution method shown in fig. (3) and draw BMD. **13**



EI - Constant Fig. 3

OR

4. Analyse the frame by moment distribution method shown in fig. (04) and draw BMD. **13**

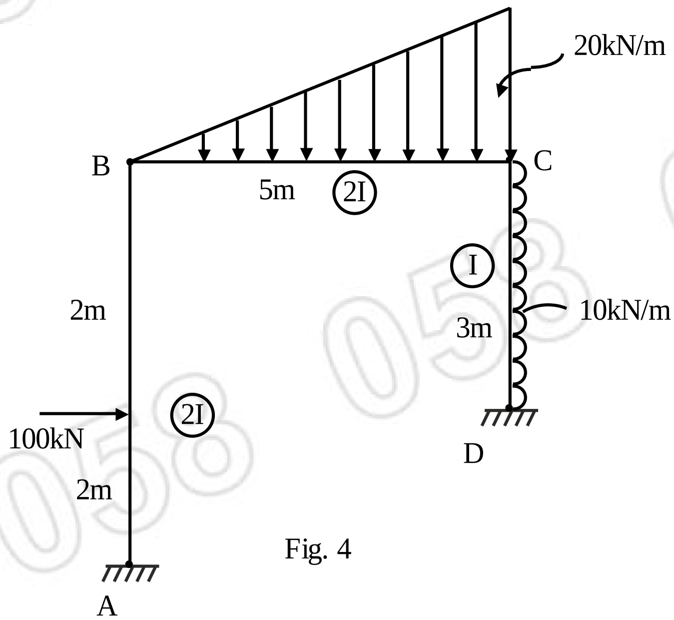
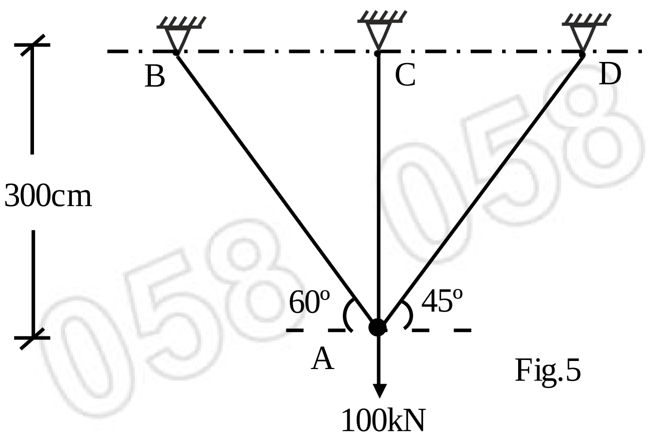


Fig. 4

5. a) Derive the stiffness matrix for Truss element. **4**

b) Determine the forces in member of given truss shown in fig. (05) **10**



$E_{AB} = E_{AD} = 8000\,kN/cm^2$

$E_{AC} = 2000\,kN/cm^2$

Area of each member $6\,cm^2$

Fig.5

OR

6. Analyse the truss shown in fig. (6) If temp. is increased by 30°, Also the length of member AC is found to be 5mm too short, $\alpha = 12 \times 10^{-6} / {}^{\circ}C$ **14**

E = 210 GPa, Area of $c/s = 750\,\text{mm}^2$

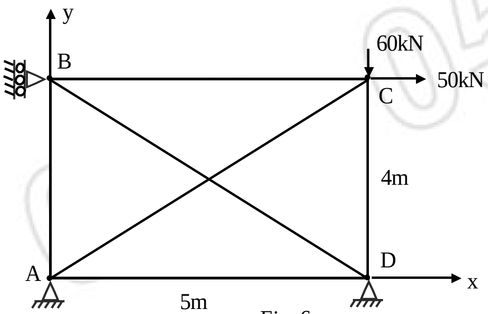


Fig. 6

7. a) Derive the stiffness matrix for beam element. **4**

b) Analyse the continuous beam shown in fig. (07) Draw SFD and BMD, EI is constant. **9**

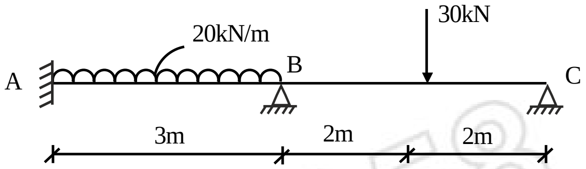


Fig. 7

OR

8. Analyse the continuous beam shown in fig. 8. Draw B.M.D. Take EI = 1 unit (Note : udl is continuous on span AB, BC & CD) **13**

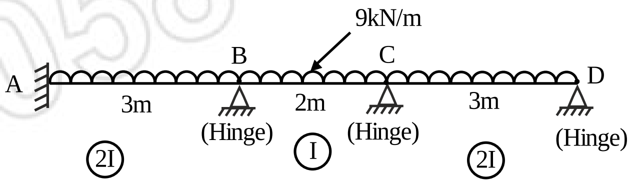


Fig. 8

9. a) Derive stiffness matrix for a plane frame element from basic principle. **5**

b) Find the global load vector of the rigid jointed frame shown in fig. 9 (b). Take external temp. = 20°C, Internal temp. = 50°C, $\alpha = 1 \times 10^{-5} / {}^{\circ}C$ $E = 2.54 \times 10^{7}\ \text{kN/m}^2$.
Size of column = 230 x 500 mm, size of beam = 230 x 650 mm.

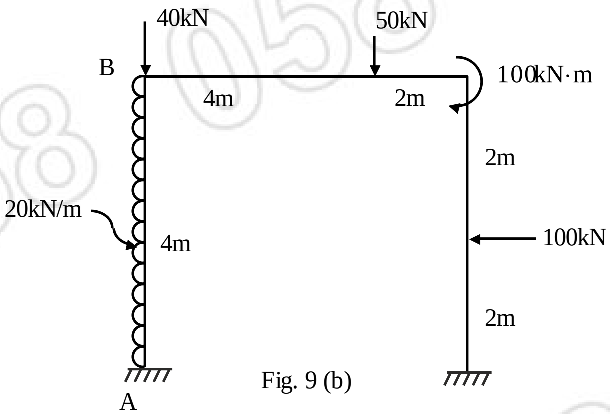


Fig. 9 (b)

OR

10. Find total Joint load vector for rigid frame shown in fig. (10) Neglect axial deformation. **13**

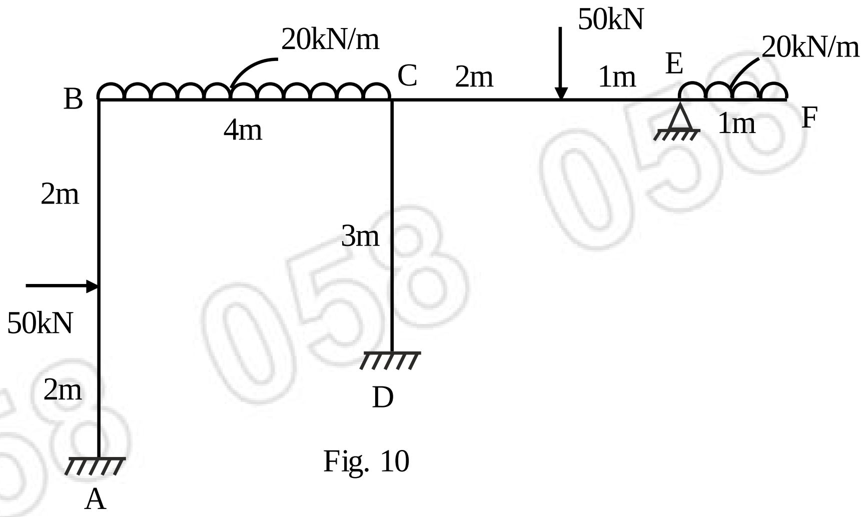


Fig. 10

11. Derive Displacement, stress, strain at Nodes of a three nodded bar as shown in fig. (11) Analyse as one dimensional problem Area of element $A(x) = A_o\, e^{(-x/26)}$ **13**

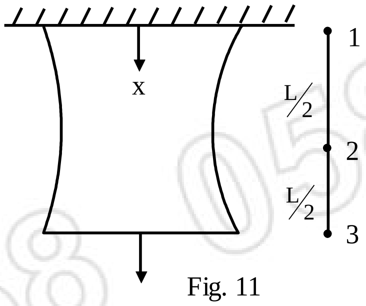


Fig. 11

OR

12. Write short notes on **any three.** **13**

a) Natural frequency.

b) Single degree of freedom system.

c) 'D' Alembert principle.

d) Damping.

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