

**Faculty of Engineering & Technology  
Fifth Semester B.E. (Civil Engg.) (C.B.S.)  
Examination**

**STRUCTURAL ANALYSIS-II**

Time—Three Hours]

[Maximum Marks—80

**INSTRUCTIONS TO CANDIDATES**

- (1) All questions carry marks as indicated.
- (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.
- (5) Use of non-programmable calculator is permitted.

1. Analyse the portal frame in Fig. 1 by Kani's method.  
Draw B.M.D. 14

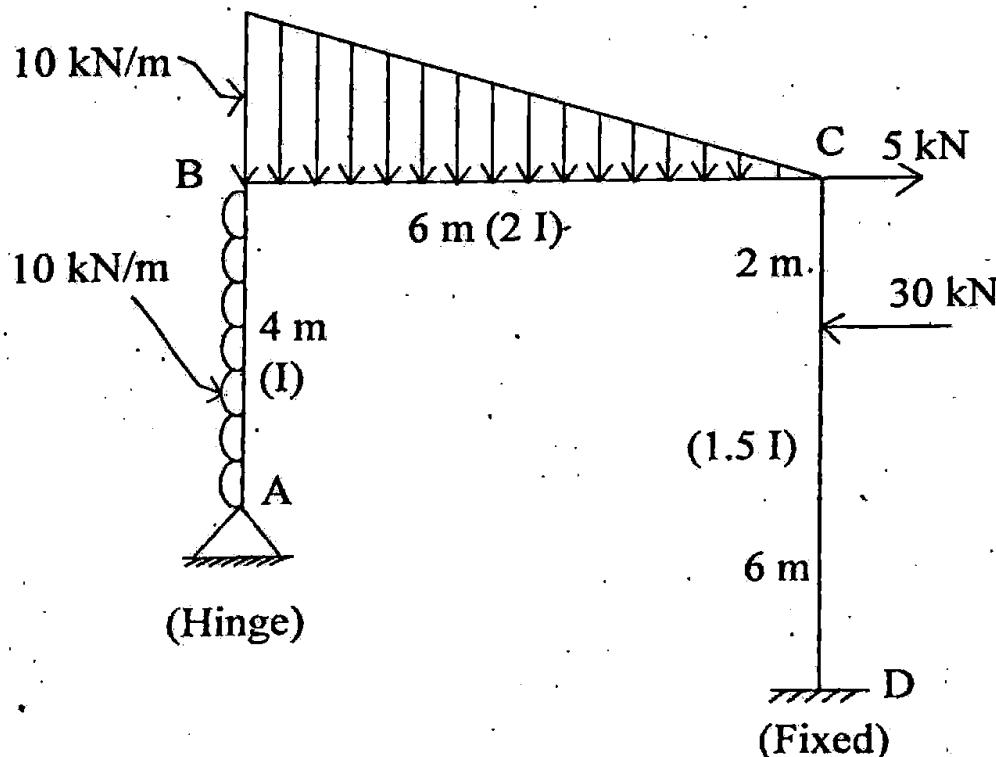


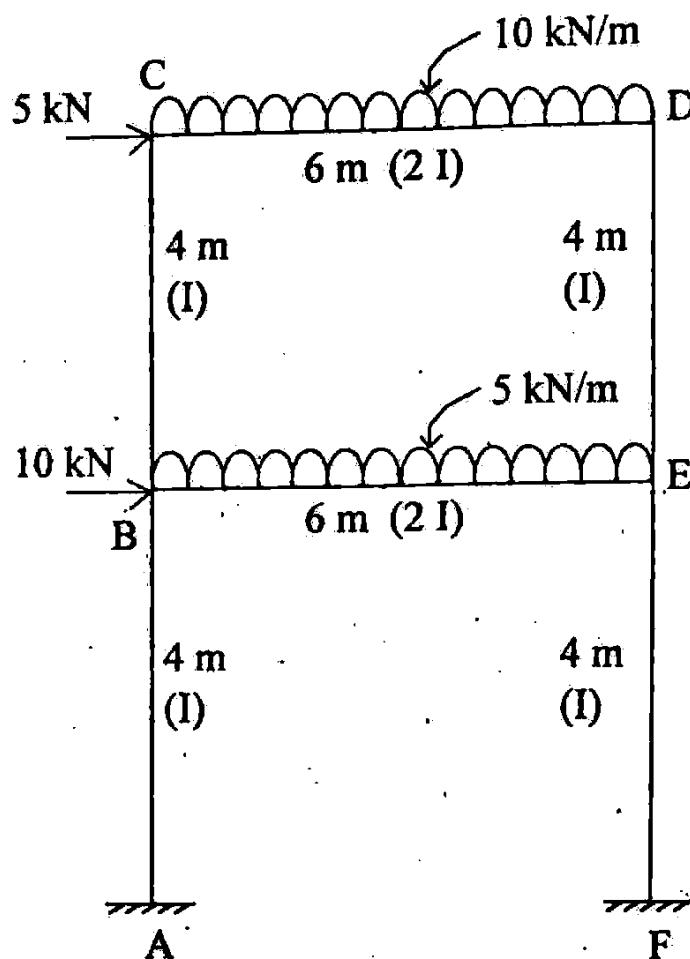
Fig. 1

**OR**

2. Analyse the portal frame in Fig. 2 by Kani's method.

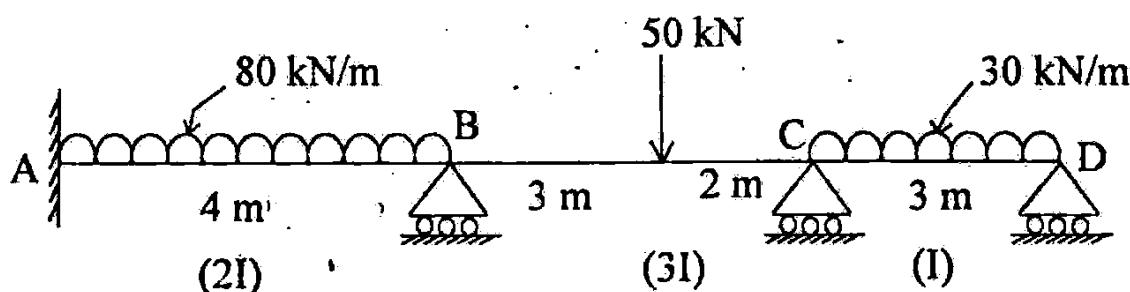
Draw B.M.D.

14



**Fig. 2**

3. Analyse the continuous beam in Fig. 3 by Moment distribution method. Draw B.M.D. 13



**Fig. 3**

**OR**

4. Analyse the portal frame in Fig. 4 by moment distribution method. Draw B.M.D. 13.

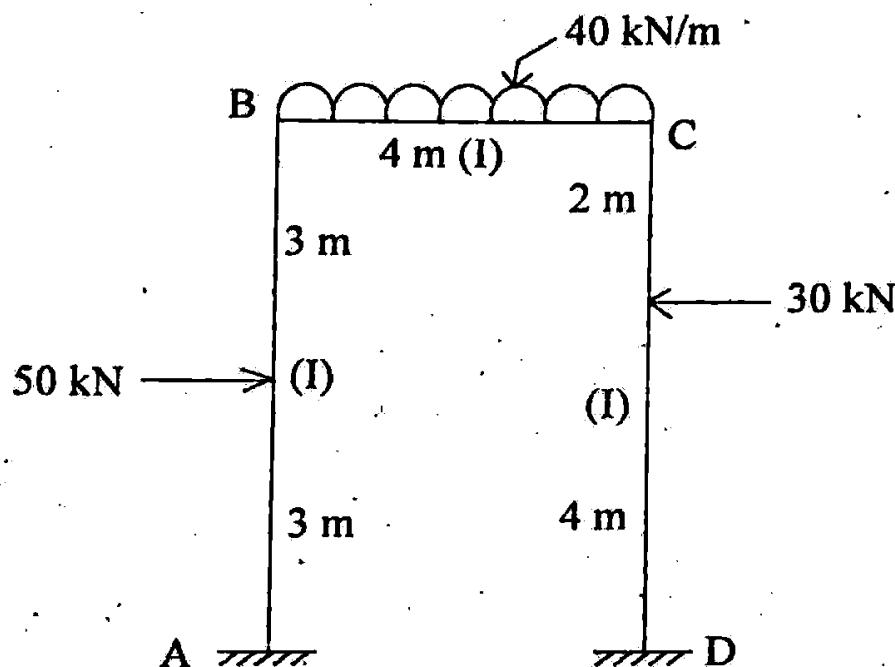


Fig. 4

5. Analyse the pin jointed truss shown in Fig. 5 by Direct Stiffness Method. Take area of cross section of members as  $1000 \text{ mm}^2$  and modulus of elasticity  $E = 200 \text{ kN/mm}^2$ . Also find out support reactions. 13.

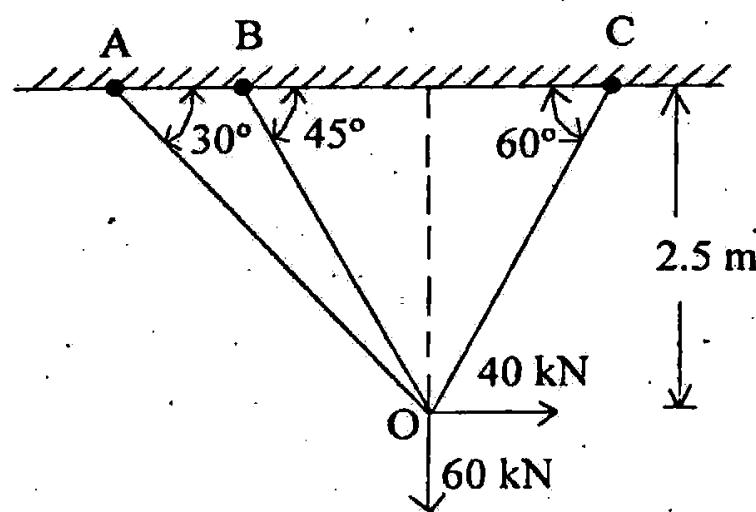


Fig. 5

OR

6. Determine the forces in members of a truss if the member BC is long by 2 mm. Take area of cross section as  $800 \text{ mm}^2$ ,  $E = 200 \text{ kN/mm}^2$  using Direct Stiffness method. Also find out support reactions. Refer Fig. 6.

13

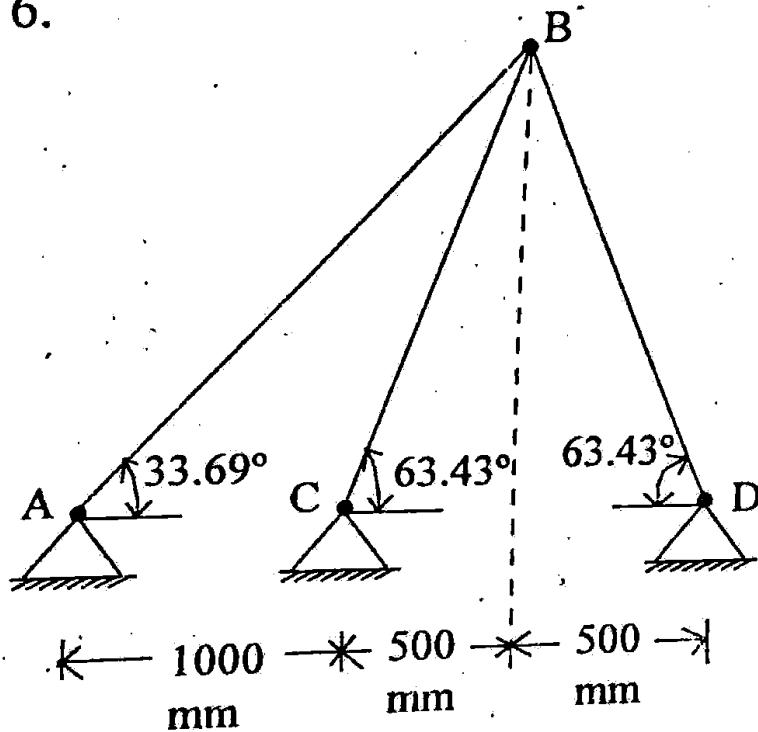


Fig. 6

7. Using Stiffness method, analyse the continuous beam shown in Fig. 7 and draw its B.M.D.

13

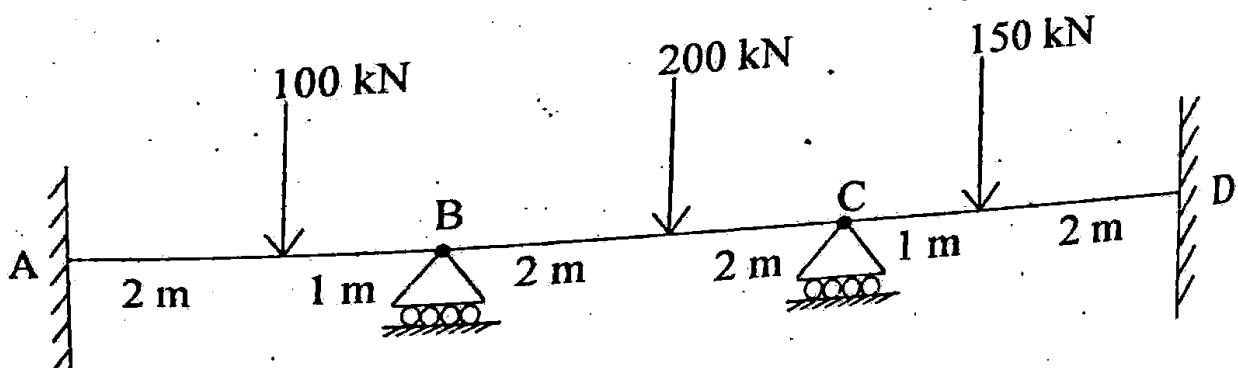
Take  $EI = 1$  units.

Fig. 7

OR

8. Analyse the given continuous beam by Stiffness Method and draw BMD. Take  $EI = 1$  units (Refer Fig. 8) 13

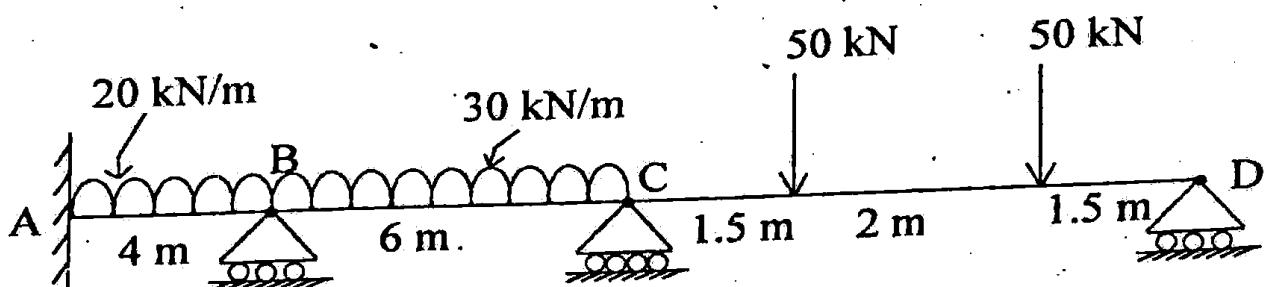


Fig. 8

9. Analyse the plane frame in Fig. 9 by Stiffness method. Draw B.M.D.  $E = 25.5 \times 10^6 \text{ kN/m}^2$ , size of member =  $30 \text{ cm} \times 50 \text{ cm}$ . Neglecting axial definition. 14

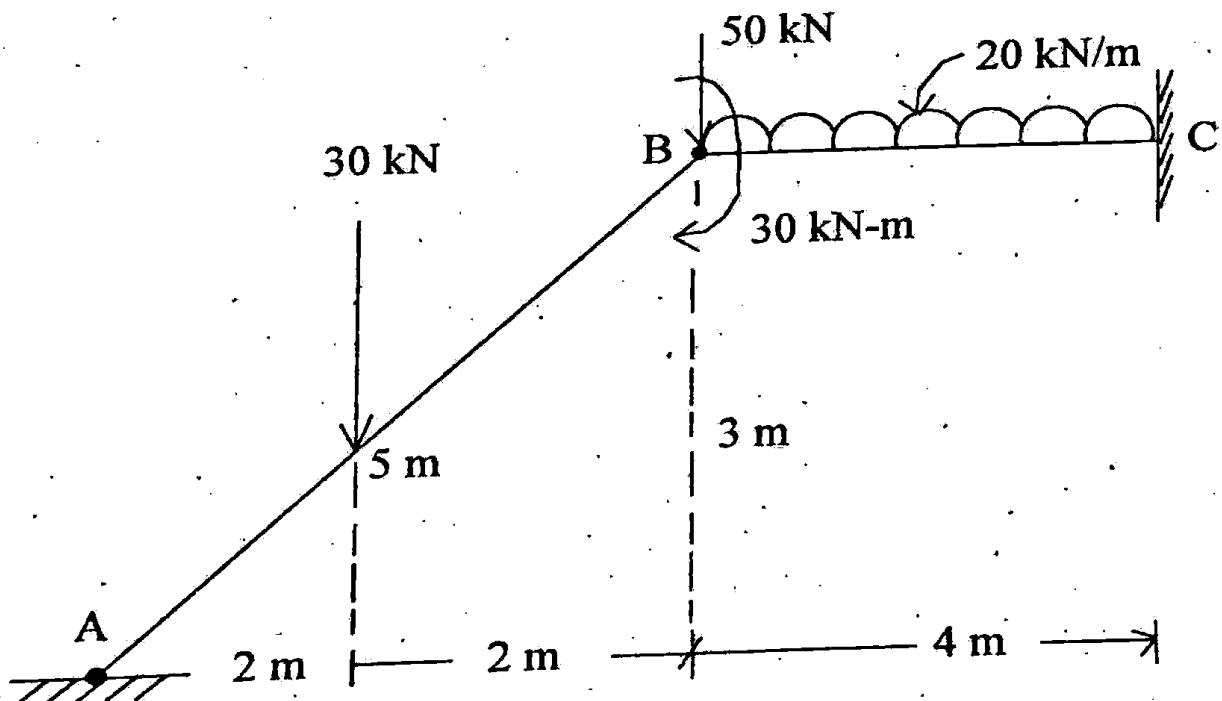


Fig. 9

**OR**

10. (A) Derive the element/member Stiffness matrix for plane frame member.

- (B) Frame the global load matrix for the portal frame in Fig. 10 (B) accounting the effect of temperature difference. Take external temperature =  $20^{\circ}\text{C}$ , internal temperature =  $50^{\circ}\text{C}$ ,  $\alpha = 1 \times 10^{-5}/^{\circ}\text{C}$ , size of column =  $(230 \times 500)$  mm and size of beam =  $(230 \times 650)$  mm.

7

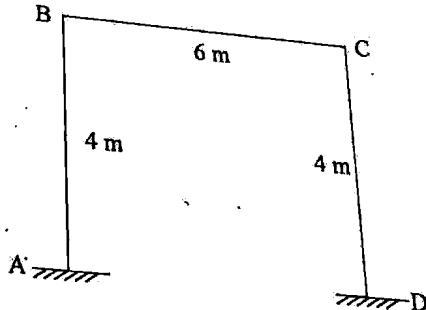


Fig. 10(B)

11. Write short notes on (any THREE) :

13

- (A) D'Alembert principle
- (B) Single degree of freedom system
- (C) Damping
- (D) Natural Frequency.

OR

12. (A) Write the steps involved in Finite Element Method.

6

MLV—6916

7

MLV—6916

6

- (B) Find out the end displacement of the bar shown in Fig. 12(B) using Rayleigh Ritz method. Assume polynomial function for displacement as  $u(x) = a_1 + a_2x$ . Take  $A = 100 \text{ mm}^2$ ,  $E = 2 \times 10^5 \text{ N/mm}^2$ .

7

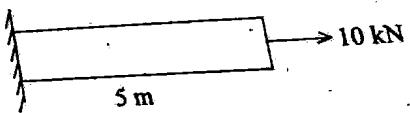


Fig. 12(B)