



- 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. Illustrate your answers wherever necessary with the help of neat sketches.
  11. Use of non programmable calculator is permitted.

1. Analyse the continuous beam ABC shown in fig (1) and plot BMD using three moment equation. 13

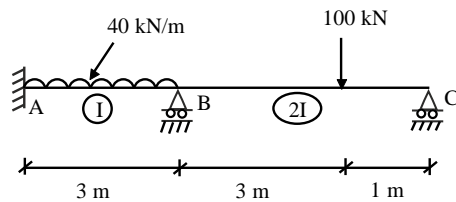


Fig. (1)

**OR**

2. Determine the fixed end moments developed in the beam shown in fig. (2) and plot BMD. 13  
if support B sinks down by 20mm with  $E = 2 \times 10^5 \text{ N/mm}^2$  and  $I = 40 \times 10^6 \text{ mm}^4$ .

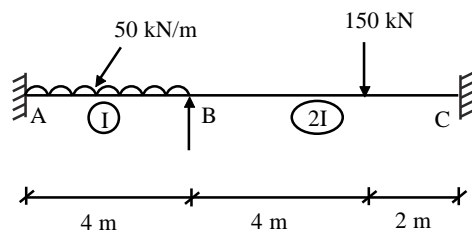


Fig. (2)

3. Four loads as shown in fig (3) are travelling over a girder of 25m span from right to left 14  
with 8kN load leading. Calculate the maximum bending moment and shear force at 7m from left support. Also calculate the absolute maximum bending moment.

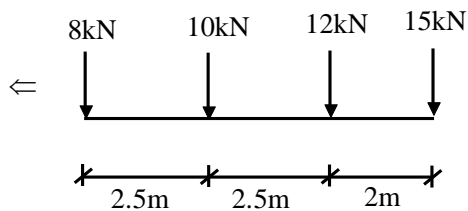
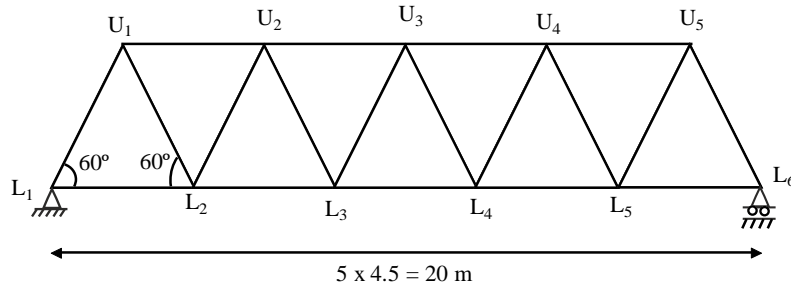


Fig. (3)

**OR**

4. Draw the influence line diagrams for forces in the members  $U_2U_3$ ,  $L_3U_3$ ,  $L_3L_4$  and  $U_3L_4$  of truss shown in fig(4) if uniformly distributed load of 50kN/m, longer than the span traverses along the bottom chord members. 14



5. Analyse the frame shown in fig(5) by strain energy method and draw BMD. 13

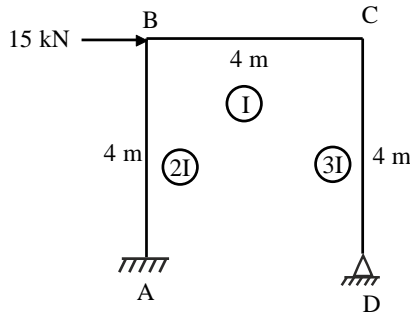


Fig. 5

OR

6. Determine the vertical deflection of Point D in the truss shown in fig(6) The cross sectional areas of members AD and DE are  $1600\text{mm}^2$  while those of the other members are  $900\text{mm}^2$ . Take  $E = 180 \text{ kN/mm}^2$ . 13

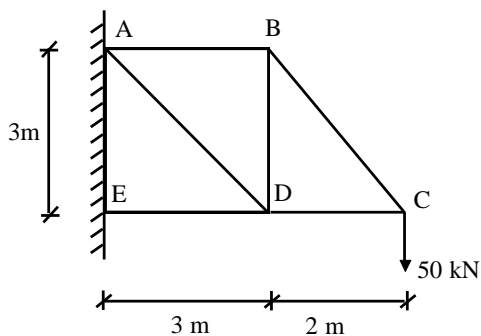


Fig. (6)

7. a) Derive the Rankine's formula for buckling of column and clarify the statement "Rankine formula is applicable for any length of the column". 7
- b) Derive from the first principle, Euler's crippling load for the column for length  $l$  with both end hinged. 7

OR

8. A two hinged parabolic arch with 35m span and 8m rise is subjected to udl of 15kN/m over left half of arch. Find the reactions at supports, normal thrust and radial shear at a section 12m from left support. Take  $I=I_C \sec \theta$  with usual notations. 13

9. Analyse the portal frame shown in fig. (7) using slope deflection method and draw BMD. **14**

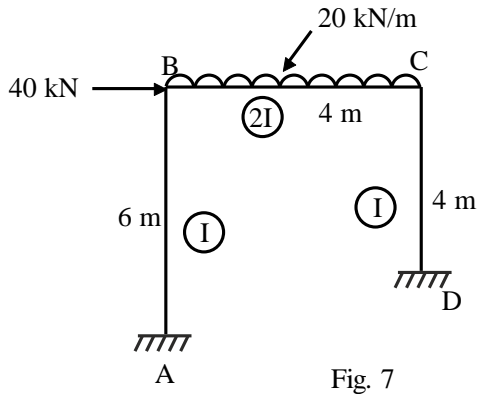


Fig. 7

**OR**

10. Analyse the frame shown in fig. (8) by portal frame method and draw BMD of beams and columns. **14**

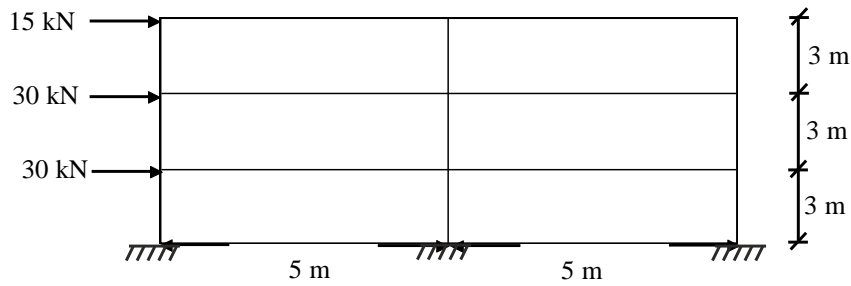


Fig. 8

11. Analyse the beam of Q. 1 shown in fig (1) using flexibility matrix method and draw BMD. **13**

**OR**

12. Analyse the fixed beam shown in fig (9) by Column Analogy Method. **13**

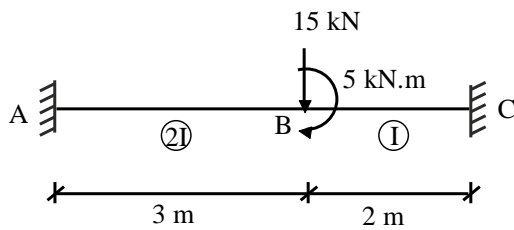


Fig. 9

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