[Total No. of Questions - 9]   [Total No. of Printed Pages - 4]

Dec.-22-0176

CE-502 (Structural Analysis-II)

B.Tech. 5th (CBCS)

Time : 3 Hours   **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt one question each from Sections A, B, C and D. Section E is compulsory. All questions carry equal marks.

SECTION - A

1. (a)   What are the different methods to solve indeterminate structure? Explain briefly about these methods. Write down general steps of consistent deformations for beams frames and trusses.   (6)

    (b)   A continuous beam with simple supports at A, B and C is subjected to the loading as shown in figure. Find the support reactions and draw Bending moment.   (6)
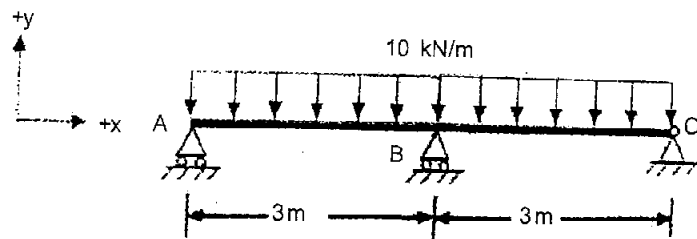

2. (a)   For the continuous beam of two equal spans draw influence line for reacting of end support.   (6)

    (b)   For the continuous beam of two equal spans draw influence line for B.M. and S.F. for the mid-point of any one span.   (6)

SECTION - B

3. (a)   Derive slope-deflection equations, stating clearly the assumptions made in deriving these.   (6)

    (b)   Analyse the frame shown in Fig. by slope deflection method for the rotational yield of 0.002 radian anti-clockwise, and that for the vertical yield of 0.5cm at the support 'A'. $EI= 3 \times 10^{12}$ Nmm^2.   (6)
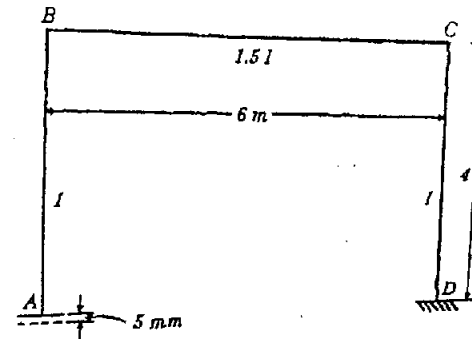
4. (a)   Derive the expressions for Carryover factor and Stiffness of a beam. What is Distribution factor?   (6)

    (b)   Continuous beam ABCD is loaded as shown in Fig. During loading support B sinks by 1 cm. Determine the support moments. I = 1600 cm^4; E = 2 × 10^5 N/mm^2.   (6)
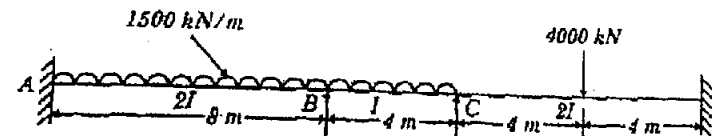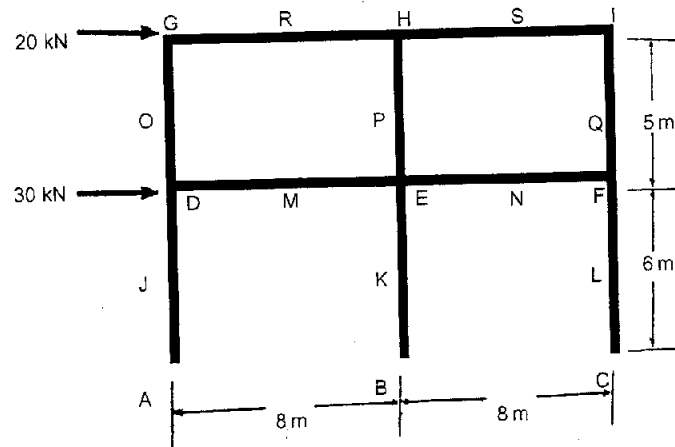

SECTION - C

5. State and explain clearly the Portal method and the Cantilever method for the approximate analysis of multistory frames subjected to horizontal forces with suitable examples. Also compare the two methods.   (12)

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6. Determine (approximately) the reactions at the base of the columns of the frame shown in Fig. Use the portal method of analysis. (12)

SECTION - D

7. State and explain clearly relationship between flexibility matrix and stiffness matrix with suitable examples. Also compare the flexibility and stiffness matrix methods of structural analysis. (12)

8. Analyse the continuous beam shown in Fig. using (i) flexibility matrix method and (ii) stiffness matrix method. (12)
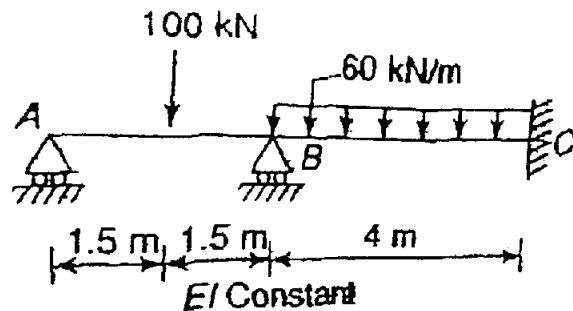
SECTION - E

9. Short answer types questions:

(a) What are the situations when single bay-single storey portal frames undergo no sidesway?

(b) What is the use of approximate analysis?

(c) Which members in the truss are zero force members?

(d) Define a substitute frame. Why substitute frame method is also known as two cycle method?

(e) Define an influence line. State its uses.

(f) Define statically indeterminate structure.   (6×2=12)