Section C

5. State and explain clearly the assumptions made in the Portal method and Cantilever method for the approximate analysis of multistorey frames subjected to horizontal forces. Also compare the two methods.

12

6. Use the cantilever method and determine (approximately) the reactions at supports A, B, C and D (Fig. 5). All columns have the same cross-sectional area.
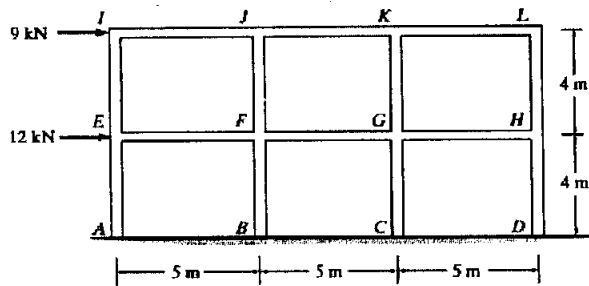
12

Fig. 5

Section D

7. Explain clearly flexibility matrix and striffness matrix with the help of force-displacement relationship. Define flexibility and stiffness with respect to axial, transverse, bending and torsional displacements. 12

July-22-00278

B. Tech. EXAMINATION, 2022

Semester V (CBCS)

STRUCTURAL ANALYSIS–II

CE-502

Time : 3 Hours   *Maximum 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 *Five* questions in all, selecting *one* question from each Section A, B, C and D. Q. No. 9 is compulsory.

Section A

1. (a) Explain briefly about consistent deformations for beams to solve indeterminate structure with suitable examples and neat sketches.   6

(b) Determine the reaction components in the continuous beam ABC shown in Fig. 1 by using Consistent Deformation Method. Flexural rigidity is constant throughout. **6**
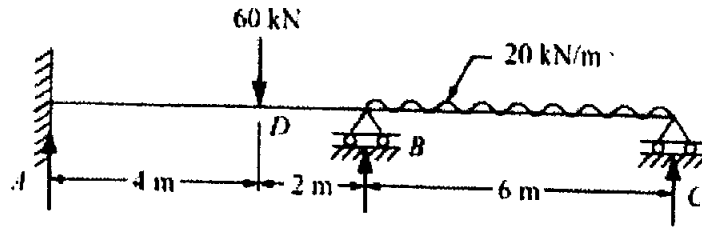

Fig. 1

2. (a) Compute the ordinates at intervals of 2 m of the influence line for B.M. at the mid-span of span BC for the continuous beam shown in Fig. 2 below. The beam has uniform moment of inertia throughout its length. **6**
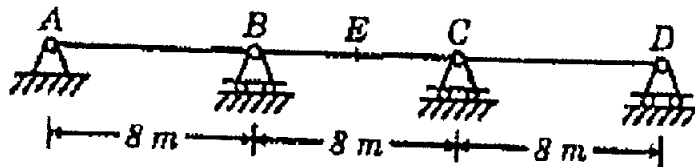

Fig. 2

(b) For the continuous beam of two equal spans fixed at an end, draw influence line for fixing moment at that end. **6**

Section B

3. (a) Find the moments at support 'A' of the propped cantilever by slope deflection method, shown in Fig. 3 below, when (a) the supports are at the same level and (b) the support 'B' by 1 cm, $EI = 2 \times 10^6$ kN-cm². **6**
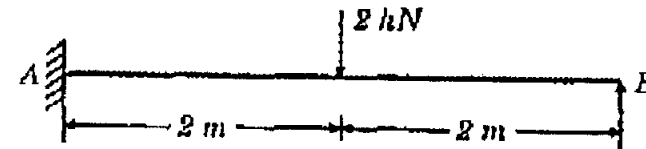

Fig. 3

(b) What are the situations when single bay-single storey portal frames undergo no sidesway or sidesway ? Explain with examples. **6**

4. (a) State and explain the procedure for determining the end moments on beam spans using moment distribution. **6**

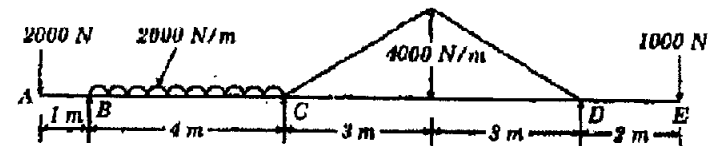(b) Analyse the continuous beam shown in Fig. 4 by moment distributed method. **6**

Fig. 4

8. Analyse the portal frame ABCD shown in Fig. 6 using (i) flexibility matrix method and (ii) stiffness matrix method. **12**
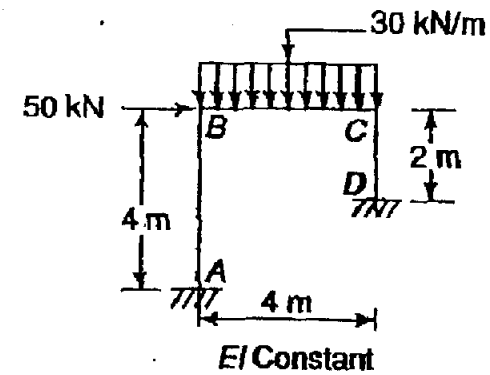

Fig. 6

(Compulsory Question)

9. Short answer type questions : 6×2=12

(a) What type of analysis is called an approximate analysis ?

(b) What are the situations when single bay-single storey portal frames undergo sidesway ?

(c) State clearly Castigliano's theorems.

(d) What is Member Global Stiffness Matrix ?

(e) What is a frame with external indeterminacy ?

(f) Differentiate clearly between Carreyover factor and Distribution factor.