

7. Analyze the beam AB having internal hinge at C. Use flexibility method. EI is uniform for all the spans. 20



SECTION - D

8. Analyze and draw bending moment diagram for portal frame using portal frame. Use stiffness method. Take EI is constant. 20



9. Derive relationship between flexibility and stiffness matrix. Prove that $[f] = [k]^{-1}$ where 1 is identity matrix. K is stiffness matrix and δ is flexibility matrix. 20

Roll No.

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M. Tech. 1st Semester Civil Engg.
(Specialization in Structural Engg.)
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ADVANCED STRUCTURAL ANALYSIS

Paper : CE-611/NTSD-102

Time : Three hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after examination.

Note : Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory. All questions carry equal marks.

1. Describe the following: 4 × 5 = 20
- Stiffness method
 - Determinate and Indeterminate structure

- (a) Types of supports
- (b) Types of loading
- (c) Flexibility method

SECTION - A

2. (a) Write the difference between flexibility matrix method and stiffness matrix method. 10

(b) For the cantilever beam shown in fig. determine the displacement D_1 , D_2 and D_3 . Assume beam was constant flexural rigids (EI). 10



3. Find the moment at B and C if downward settlement of supports B and C are 10 mm and 5 mm respectively. Take $EI = 184 \times 10^{11} \text{ N/mm}^2$. Use flexibility matrix method. 20



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SECTION - B

4. Analyze the pin jointed plane frame shown in fig by flexibility matrix method. All members have same EA. Find forces in members BC, CI and EC. 20



5. Analyze the rigid frame as shown in fig below by flexibility matrix method. 20



SECTION - C

6. Analyze the continuous beam shown in fig using displacement method. Take EI is same. 20



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