

Roll No. ....

23377

**M. Tech. 1st Semester (Civil Engg.)  
(Specialization in Structural Engg.)  
Examination – January, 2023  
ADVANCED STRUCTURAL ANALYSIS**

Paper : CE-611/MTSD-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. Q. 1 is *compulsory*. Attempt *four* more question from the sections A, B, C & D by selecting *one* question from each Section.

1. Describe the following : 20
- (a) Types of supports
  - (b) Determinate and Indeterminate structure
  - (c) Types of beams
  - (d) Types of loading
  - (e) Stiffness method

**SECTION – A**

2. Discuss various steps to be followed while analyzing the structure by stiffness method. 20

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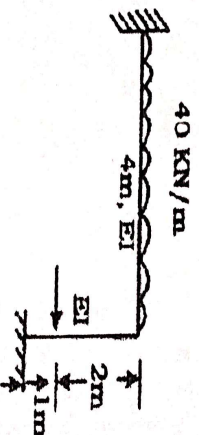
P. T. O.

3. A continuous beam ABCD is loaded as shown in figure. It has constant flexural rigidity. Fixed support at A, roller support at B and guided support at C. Analyze the beam using stiffness method. 20

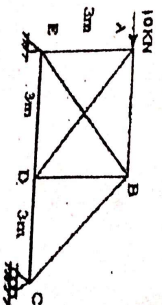


SECTION - B

4. Portal frame ABC is loaded as shown in figure. It is subjected to UDL 4 kN/m over span AB. Draw Bending moment diagram taking EI constant for AB and BC. Use stiffness method for analysis. 20



5. A pin jointed truss shown in figure. Analyze the truss by stiffness method. 20

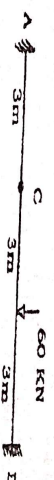


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6. Differentiate between structure approach and member approach used in stiffness matrix method. Explain how support condition are accounted in both approaches? 20

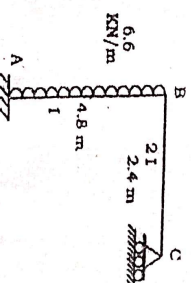
SECTION - C

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 flexibility matrix method. 20



9. (a) State Maxwell reciprocal theorem and indicate where its effect is evident in matrix analysis of a structure. 10  
 (b) Explain properties and special characteristics of flexibility matrix of a structure. 10

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