

SECTION – D

8. (a) What are the different coordinate systems ?
Explain with neat sketch. 10
(b) Explain Modified Galerkin Method for the
Numerical Solution of Boundary Value Problems. 10
9. Discuss the advantages and disadvantages of FEM
over (i) Classical method (ii) Finite difference method. 20

23721-100-(P-4)(Q-9)(23) (4)

Roll No.

23721

**M.Tech. 1st Sem. Civil Engg. (Computer
Aided Structural Engg.) CBCS Scheme
Examination – January, 2023**

ADVANCED METHODS OF STRUCTURAL ANALYSIS

Paper : 21MTCASE2C1

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 by selecting *one* question
from each Unit. Question No. 1 is *compulsory*. All
questions carry equal marks.

1. (a) What are the differences between static and
kinematic indeterminacies ?
- (b) Give the mathematical expression for the degree
of static indeterminacy of rigid jointed plane
frames.
- (c) What are the requirements to be satisfied while
analyzing a structure ?
- (d) Define local and global coordinates.

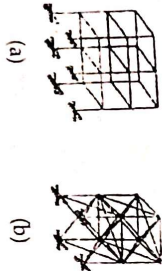
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- (e) Briefly mention the two types of matrix methods of analysis of indeterminate structures.
- (f) What is a grid ?
- (g) What are the general constituents of finite element software ?
- (h) Define plane stress with a suitable example.
 $2.5 \times 8 = 20$

SECTION - A

2. (a) Determine the degree of static indeterminacy of the rigid jointed building frame shown in Figure (a). 10
- (b) Determine the degree of static indeterminacy of the pin jointed space frame shown in Figure (b). 10

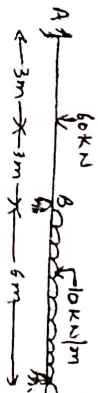


3. (a) Define Degree of Freedom and explain its types. 5
- (b) A simply supported beam of span 4 m is carrying a uniformly distributed load of 5 kN/m as shown in Fig. Using the principle of virtual work, find the reactions at A and B. 15

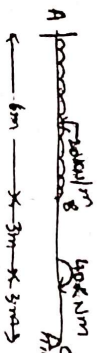


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4. Analyze the continuous beam shown in figure using the matrix flexibility method. 20



5. A two span continuous beam ABC is fixed at A and simply supported over the supports B and C. AB = 6 m and BC = 6 m. The moments of inertia is constant throughout. It is loaded as shown in the diagram. Analyse the beam by matrix stiffness method. 20



SECTION - C

6. Differentiate between structural approach and member approach used in stiffness matrix method. Explain how support conditions are accounted in both the approaches. 20
7. With a suitable example explain analysis of plane trusses. 20

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