Total No. of Questions : 12]

SEAT No. :

P2641

[Total No. of Pages : 3

[5154]-9
B.E. (Civil)
MATRIX METHODS OF STRUCTURAL ANALYSIS
(2008 Pattern) (Semester - I) (Elective - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Your answers will be valued as a whole.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Write a note on (Any two): **[16]**

a) Ill conditioned matrix.

b) Gauss Jordon & Gauss Seidel iteration method.

c) Gauss Elimination Method.

OR

Q2) a) Write a note on "Importance of Matrix Algebra in Matrix Methods of Structural analysis". **[4]**

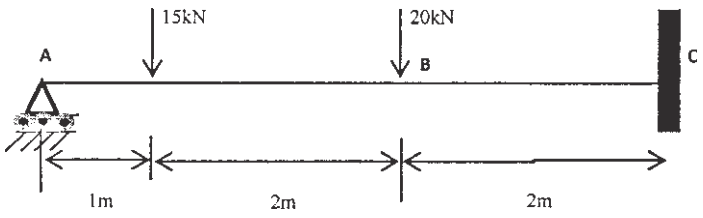
b) Solve the following equations by Gauss Elimination Method **[12]**

$X_1 - 0.4X_2 + 0.8X_3 = 5$

$-2X_1 + X_2 + X_3 = 1$

$8X_1 + 2X_2 = 12$

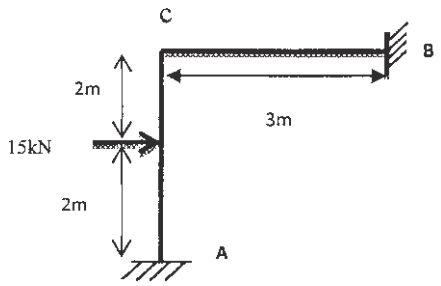
Q3) Analyze the beam shown below by flexibility method (EI is constant) **[18]**



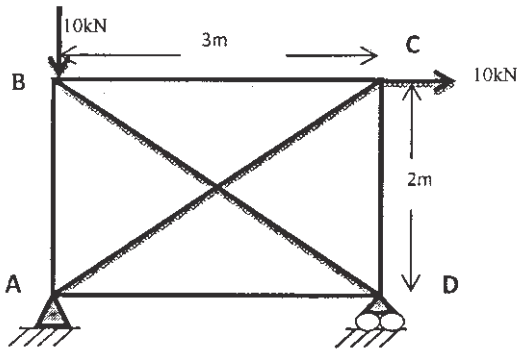
OR

P.T.O.

Q4) Analyze the portal frame using Flexibility Method (EI constant): **[18]**



Q5) Analyze the truss by Flexibility Method (EI constant). **[16]**



OR

Q6) Analyze the beam shown in Ex. 3 by Stiffness Method (EI is constant). **[16]**

SECTION - II

Q7) Write a note on: **[16]**

a) Displacement Method of structural analysis.

b) Effective node numbering.

OR

Q8) a) Explain structure and member approaches. **[8]**

b) Using first principles, establish relationship between local & global stiffness matrix of portal frame member. State clearly transformation matrix. **[8]**

Q9) a) Explain how stiffness matrix of a member of a structure in a structure co-ordinate system is obtained by transformation. **[9]**

b) Using proper DOFs, write clearly stiffness matrix equation for a member of orthogonal grid structure. Explain various terms involved in matrix equation. **[9]**

OR

Q10)a) State Maxwell's reciprocal theorem and indicate its effect in matrix analysis of structure. **[9]**

b) State importance of band width in stiffness analysis by computer and measures to keep it minimum. **[9]**

Q11) A single bay single storey frame is to be analysed by computer programme of stiffness matrix method. **[16]**

a) Prepare the flowchart and state input required.

b) How will you input support conditions.

OR

Q12) Stating clearly DOFs/node, explain stiffness matrices for space truss member & space frame member. In which case you need transformation matrix? Explain reason. **[16]**