Total No. of Questions : 12]

SEAT No. :

P3623

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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 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 pocketcalculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Write a note on : **[16]**

a) Gauss Jordon & Gauss Seidel iteration method.

b) Computer Algorithm & Programming aspects.

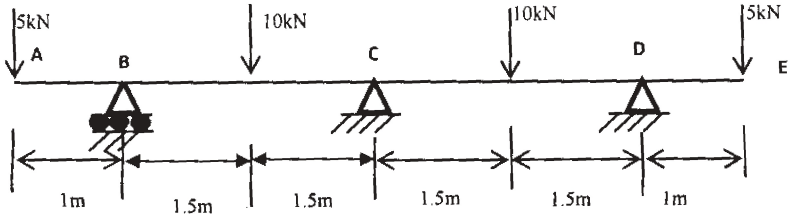
OR

Q2) a) Write a note on "Importance of Matrix Algebra in Matrix Methods of Structural analysis". **[6]**

b) Solve the following equations by Gauss Elimination Method **[10]**

$$5x_1 - 2x_2 + 4x_3 = 5$$
$$-2x_1 + x_2 + x_3 = 1$$
$$4x_1 + x_2 = 6$$

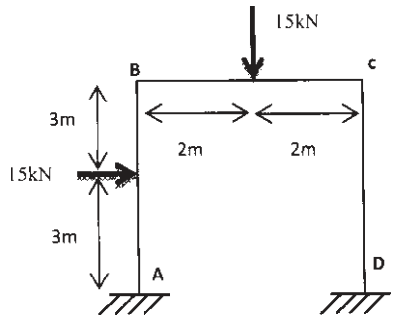
Q3) Analyze the beam shown below by flexibility method (EI is constant). **[18]**



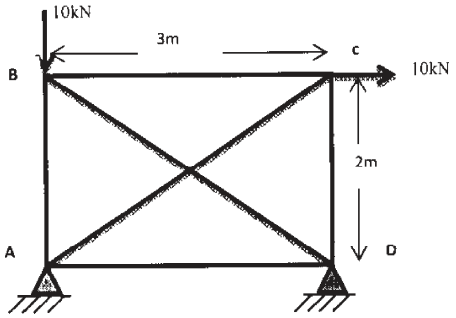
OR

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) Determinacy and Indeterminacy.

OR

Q8) a) Differentiate between structure approach and member approach used in stiffness matrix method. Explain how support conditions are accounted in both approaches. **[8]**

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

Q9) a) Using proper DOF's, write stiffness matrix equation for a member of orthogonal grid structure. **[9]**

b) Explain properties and special characteristics of stiffness matrix of a structure. **[9]**

OR

Q10) Stating clearly DOFs/node, explain stiffness matrix for space truss member and space frame member. In which case you need transformation matrix. Explain reason. **[18]**

Q11) A single bay three storied frame is to be analyzed by computer programme of stiffness matrix method **[16]**

a) Prepare the flow chart for the programme and state input required for the same.

b) How will you input support conditions of the structure.

OR

Q12) Analyze and draw BMD for grid structure as shown below by stiffness method. **[16]**