Total No. of Questions : 12] SEAT No. :

P3321

[Total No. of Pages : 3

[4759] - 9
B.E. (Civil Engg.) (Semester - I)
MATRIX METHODS OF STRUCTURAL ANALYSIS
(2008 Pattern) (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 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 Elimination Method

OR

Q2) a) Write a note on "Computer Algorithm & Programming aspects". **[6]**

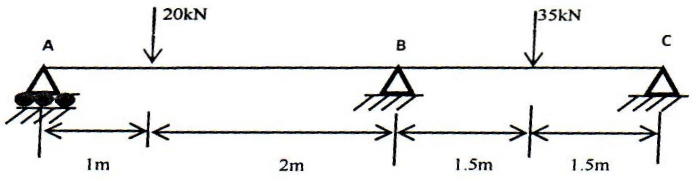
b) Solve the following equations by Gauss Elimination Method **[10]**

$$3X_1 + 2X_2 + 3X_3 = 80$$

$$X_1 - 9X_2 + 2X_3 = 1$$

$$2X_1 + 3X_2 + 6X_3 = 31$$

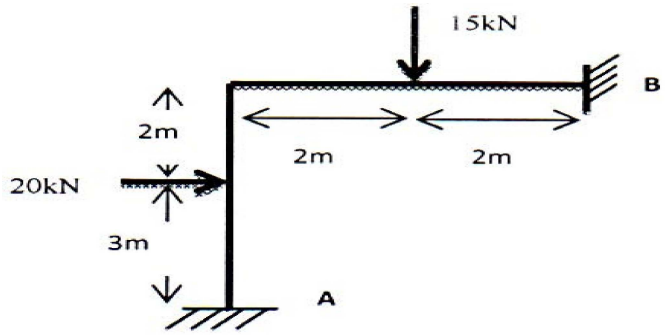
Q3) Analyze the beam shown below by flexibility method (El is constant) **[18]**



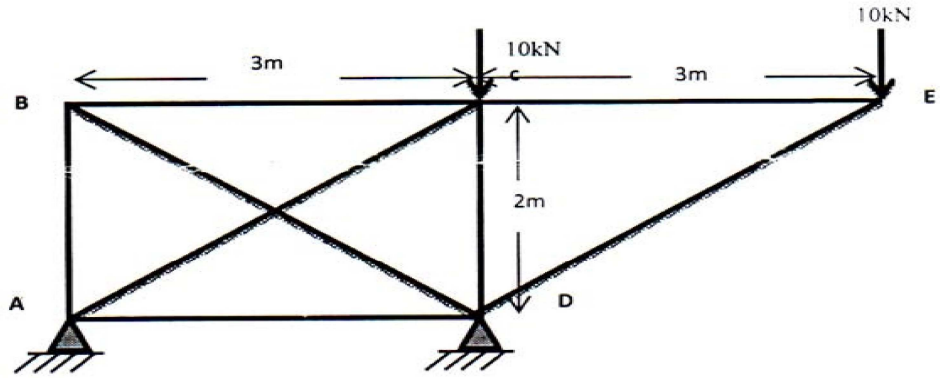
P.T.O.

OR

Q4) Analyze the portal frame using Flexibility Method (El Constant) **[18]**



Q5) Analyze the truss by Flexibility Method (El Constant) **[18]**



OR

Q6) Analyze the beam shown in Ex. 3 by Stiffness Method (El is Constant) **[18]**

SECTION- II

Q7) Write a note on

a) Force Method of structural analysis

b) Effective node numbering

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 DOFs write clearly stiffness matrix equation for a member of orthogonal grid structure. Explain various terms involved in matrix equation. **[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) Using structure approach, develop only stiffness matrix of grid structure for the figure shown in Ex 12. GJ = 0.4EI and uniform for all members. **[18]**

OR

Q12) Analyze and draw BMD for grid structure as shown below by stiffness method. **[18]**