Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. IST Semester–Remedial Examination – July- 2011

Subject code: 712001N

Subject Name: Advanced Structural Analysis

Date:07/07/2011 **Time: 10:30 am – 01:00 pm**

Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Write the flowchart OR subprogramme for solving simultaneous equations.	**07**
	(b)	Differentiate between stiffness matrix and flexibility matrix methods giving their merits and demerits.	**07**
Q.2	**(a)**	Discuss how shear deformations can be included in analysis of the structures. In which structures one should include the shear deformations for better analysis?	**07**
	(b)	Derive the stiffness matrix for a beam element when the shear deformations are to be included.	**07**
		OR	
	(b)	What is nonlinearity? How the structure can be analyzed for elastic nonlinearity?	**07**
Q.3	**(a)**	For the structure as shown in the figure.1 create the flexibility matrix assuming the moment at A and reaction at B as unknown. The flexural rigidity of all the members is 20000kN-m^2 and support B settles by 0.02m.	**07**
	(b)	For the above structure derive the nodal displacement vector and hence analyze the structure and draw the final bending moment diagram.	**07**
		OR	
Q.3	**(a)**	For the structure as shown in the figure.2 create the flexibility matrix assuming reactions at D as unknown. Assume that all the members have equal flexural rigidity.	**07**
	(b)	For the above structure derive the nodal displacement vector and hence analyze the structure and draw the final bending moment diagram.	**07**
Q.4	**(a)**	For the structure as shown in the figure.1 create the stiffness matrix. The flexural rigidity of all the members is 20000kN-m^2 and support B settles by 0.02m.	**07**
	(b)	For the above structure derive the load vector and hence analyze the structure and draw the final bending moment diagram.	**07**
		OR	
Q.4	**(a)**	For the structure as shown in the figure.3 create the stiffness matrix. Assume that all the members are having same flexural rigidity.	**07**

(b) For the above structure derive the load vector and hence analyze the structure and draw the final bending moment diagram. **07**

Q.5 **(a)** Analyze the structure as shown in figure.4 by flexibility matrix method assuming that all the members have equal area and tabulate the forces in all the members. **07**

(b) Derive the flexibility matrix for the structure shown in the figure.2 if the axial deformation is to be included. Assume the values of E=2x105N/mm2, b=200mm and d=300mm. **07**

OR

Q.5 **(a)** Analyze the structure shown in the figure.5 by stiffness matrix method and tabulate the forces in the members. **07**

(b) Derive the final stiffness matrix for the structure shown in the figure.3 if the axial deformation is to be included. Assume the values of E=2x105N/mm2, b=200mm and d=300mm. **07**

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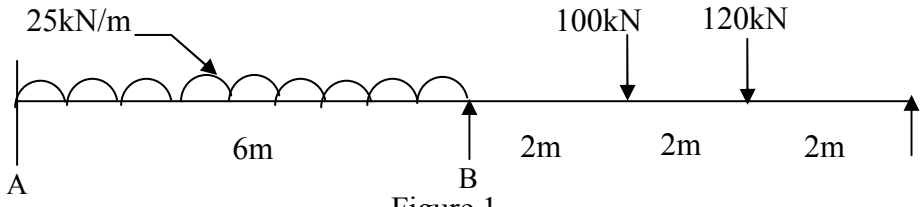

Figure.1

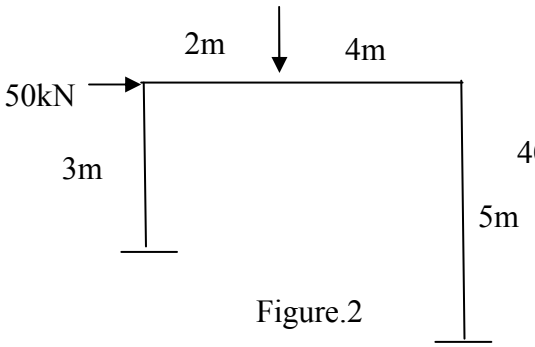

Figure.2

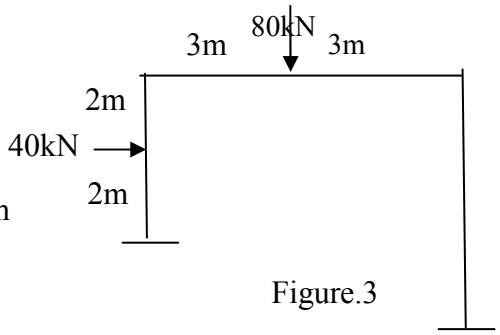

Figure.3

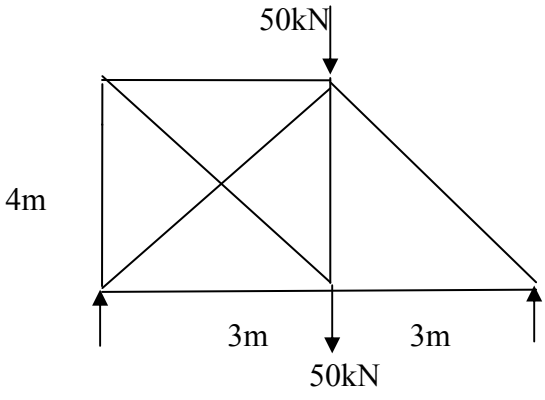

Figure.4

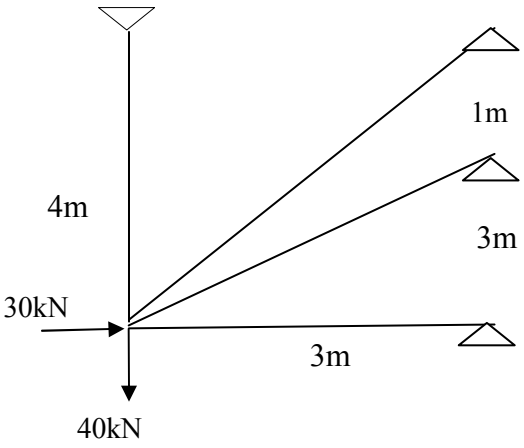

Figure.5

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