Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VII • EXAMINATION – WINTER 2013

Subject Code: X70606 **Date: 10-12-2013**

Subject Name: Advanced Structural Analysis

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)**	Derive Stiffness matrix for a plane frame with usual notations.	**07**
	(b)	Explain : [SMS], [R], {AC}, {AE}, [ARC], {AM}, [SRF]	**07**
Q.2	**(a)**	Write basic steps of F.E.M. and explain any one in detail.	**07**
	(b)	Explain use of Symmetry and Anti-symmetry in analysis of complex structures with suitable example.	**07**
		OR	
	(b)	Explain any two different loading facilities in the professional software.	**07**
Q.3	**(a)**	Enlist various secondary effects. Explain procedure to incorporate these effects in analysis.	**04**
	(b)	Analyse the beam as shown in **Figure-1** and draw SFD, BMD. Use Stiffness Member Approach.	**10**
		OR	
Q.3		Analyse the Plane frame shown in **Figure-2** using Stiffness Member Approach. Consider EI = EA for all members.	**14**
Q.4		Analyse the plane truss as shown in **Figure-3** using stiffness member approach. Calculate Member end actions. All members have same axial rigidity.	**14**
		OR	
Q.4		Analyse the Grid as shown in **Figure-4** below and draw SFD, BMD and TMD. Use Stiffness Member Approach. Consider EI = GJ = Constant.	**14**
Q.5	**(a)**	Derive Stiffness Matrix for two noded bar element using finite element method.	**07**
	(b)	For a bar element as shown in **Figure-5,** calculate nodal displacements and element stresses. Consider E = 200 GPa.	**07**
		OR	
Q.5	**(a)**	Derive Stiffness Matrix for two noded beam element using finite element method.	**07**
	(b)	Explain plane stress and plane strain problems with proper examples.	**07**

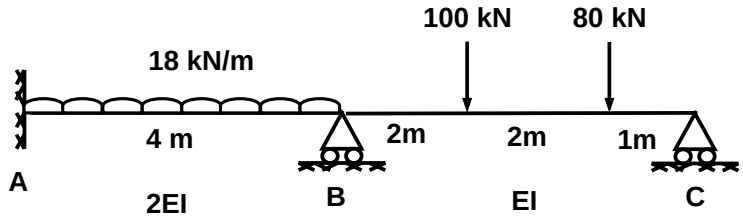

Fig. -1

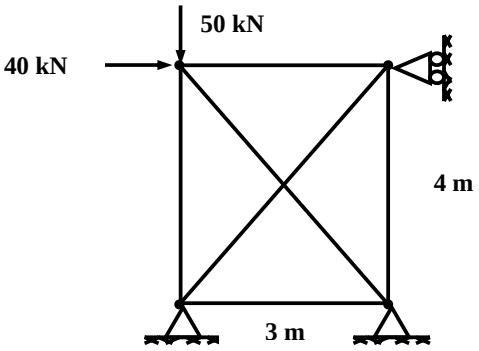

Fig. -3

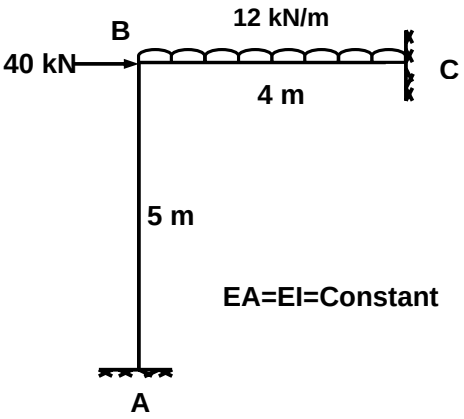

Fig. -2

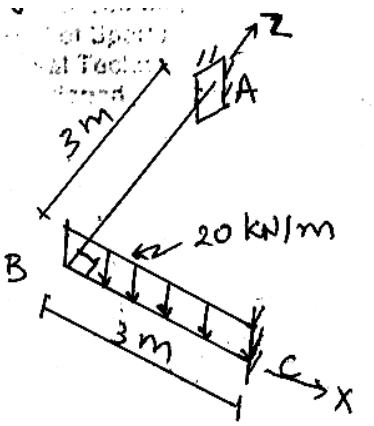

Fig. -4

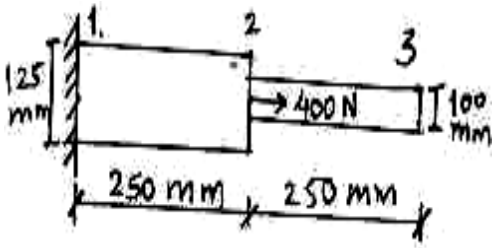

Fig. - 5

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