## **GUJARAT TECHNOLOGICAL UNIVERSITY** PDDC - SEMESTER-VII • EXAMINATION – WINTER • 2014

Subje	ect (	Code: X 70606 Date: 05-12-2014	
Subject Name: Advanced Structural Analysis			
Time	Time: 10:30 am - 01:00 pm Total Marks: 70		
Instructions:			
	1.	Attempt all questions.	
	2. 3	Make suitable assumptions wherever necessary. Figures to the right indicate full marks	
	5.	rightes to the right indicate full marks.	
Q.1	<b>(a)</b>	Derive Stiffness matrix for a beam with usual notations.	07
	<b>(b</b> )	Explain : [Sm], [RT], {AJ}, {AE}, [SFF], {AM}, [SRF]	07
Q.2	(a)	Explain advantages of Finite Element Method in detail.	07
c	(b)	Write basic steps of F.E.M. and explain any two in detail. OR	07
	(b)	Explain any two different loading facilities in the professional software.	07
Q.3	(a)	What are the advantages of Stiffness Member approach? Explain in detail.	04
	(b)	Analyse the beam as shown in Figure-1 below and draw BMD. Use	10
		Stiffness Member Approach.	
0.2		<b>UR</b> Analyse the beam as shown in <b>Figure 1</b> if Support <b>P</b> is sinking 10 mm in	1/
Q.3		Analyse the beam as shown in <b>Figure-1</b> in Support B is sinking 10 min in downward direction. Take $E = 200$ GPa and $I = 200 \times 10^6$ mm <sup>4</sup> .	14
Q.4	(a)	Derive Member stiffness Matrix for truss with usual notations.	04
	(b)	Analyse the plane truss as shown in Figure-2 using stiffness member	10
		approach. Calculate Member end actions.	
0.4		OR Analyze the Diana frame share in Figure 2 years Stiffness Marshar	14
Q.4		Analyse the Plane frame snown in Figure-3 using Stiffness Member	14
		Approach.	
Q.5	(a)	Derive Stiffness Matrix for two noded bar element using finite element	07
-		method.	
	(b)	Explain convergence criteria in detail also explain need of convergence.	07
0.5	$(\cdot)$	OR Device Stiffered Metric for the set of the last of the last	07
Q.5	(a)	Derive Stiffness Matrix for two noded beam element using finite element method.	U7
	(b)	Explain convergence criteria in detail.	07











**Fig.** -2

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