Seat No.: Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (NEW).EXAMINATION – WINTER 2016

Subject (Code: 2	2160609 Date: 27/10/201	16
Time: 10 Instructions 1. 2.	:30 AN s: Attempt Make st	Computational Mechanics M to 01:30 PM Total Marks: 70 t all questions. uitable assumptions wherever necessary. to the right indicate full marks.)
Q.1	1 2 3 4 5 6 7	Short Questions What is stiffness matrix? Newton-Raphson method is used to solve for which type of problem? What is Elastic Support in beam? What are the boundary conditions and compatibility Condition. State Hook's law. What is Composite structures? What do you mean by Axial flexural interaction?	14
Q.2	2 (a)	Write the steps in detail to analyze plane truss by using Stiffness member approach.	07
	(b)	What are the secondary effects in stiffness method of analysis? OR	07
	(b)	Explain the concept of symmetry & anti-symmetry giving appropriate examples	07
Q.3	3	Analyze the fixed beam shown in fig-1 by the Stiffness Matrix method using member approach. Find the force and displacement responses. Draw S.F and B.M diagrams.	14
Q.3	3	Analyze the plane frame using stiffness member approach shown in fig - 2 . Support 'A' settle by 1 mm Support 'B' settle by 2 mm $EI = 8 \times 10^4 kN.m^2$	14
Q.4	(a)	What is Finite Element Method, Explain in detail? Also discuss advantages and disadvantages.	07
	(b)	Determine the Shape functions for Constant Strain Triangle. Use natural Coordinate Systems OR	07
Q. 4	l (a)	What is non linearity? Explain geometrical, material and loading non linearity giving appropriate examples	07
	(b)	Explain how following issues are handled in analysis (i) Sinking of support (ii) Presence of inclined support	07

- Q.5 (a) Briefly explain the steps involved in finite element analysis. 07 Discuss the assembly process in detail
 - (b) Derive the shape function & its variation for two noded Beam 07 element by using Generalized co-ordinate.

OR

- Q.5 (a) A bar shown in Fig. 3 has an axial load, $P = 100 \times 10^3 \text{ N}$.
 - (i). Determine the nodal displacement.
 - (ii). Determine the stress in each element.
 - (iii). Determine the reaction Forces.
 - (b) Derive the Shape functions for four Noded Quadrilateral **07** elements.





