GUJARAT TECHNOLOGICAL UNIVERSITY
Bachelor of Engineering - SEMESTER - VI EXAMINATION - WINTER 2025

Subject Code: 3164103   **Date: 21-11-2025**

Subject Name: Modelling and Simulation

Time: 02:30 PM TO 05:00 PM   **Total Marks: 70**

Instructions

1. Attempt all questions.

2. Make suitable assumptions wherever necessary.

3. Figures to the right indicate full marks.

4. Simple and non-programmable scientific calculators are allowed.

			Marks
Q.1	**(a)**	Explain the usage of CAD tools in various stages of design process.	**03**
	(b)	Differentiate Bottom up assembly modelling approach and Top down assembly modelling approach with example.	**04**
	(c)	What is interference? Discuss different types of interferences?	**07**
Q.2	**(a)**	State the importance of graphic standard in CAD.	**03**
	(b)	List various data exchange standards with its full name. Explain any one briefly.	**04**
	(c)	Write a short note on Open Graphics Library.	**07**
		OR	
	(c)	Discuss Graphical Kernel System in Computer Aided Design.	**07**
Q.3	**(a)**	Define FEM? Why do we use FEM?	**03**
	(b)	What is Discretization in FEM? Describe its importance.	**04**
	(c)	Compare and contrast CST, LST and QST element.	**07**
		OR	
	(a)	List various applications of FEM in industry.	**03**
	(b)	What is Mesh in FEM? Differentiate Mesh refinement and Mesh enrichment.	**04**
	(c)	Detail the steps involved in FEM with example.	**07**
Q.4	**(a)**	Briefly discuss various types of FEA software.	**03**
	(b)	Discuss points to be considered while incorporating temperature effects in the FEA result?	**04**
	(c)	Illustrate Equilibrium equations, Kinematic equations and Constitutive equations.	**07**
		OR	
	(a)	What is natural coordinate system? Describe its objectives with example.	**03**
	(b)	Write detail procedure of stress calculations in FEM with example.	**04**
	(c)	Draw and explain various 2-D finite elements and 3-D finite elements.	**07**

Q.5 (a) Elaborate axi-symmetric field problem. **03**

(b) Briefly discuss Shape Function. **04**

(c) Describe Plane Stress Condition and Plane Strain Condition. **07**

OR

(a) Define Geometric isotropy. What is significance of Geometric isotropy in Finite Element Analysis? **03**

(b) Write formulation steps for 2D Scalar Field Problems **04**

(c) Discuss shape Function for Triangular Elements for Constant Strain Triangle. **07**

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