Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - VI EXAMINATION - SUMMER 2025

Subject Code: 3164103 **Date: 28-05-2025**

Subject Name: Modelling and Simulation

Time: 10:30 AM TO 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.**

			Marks
Q.1	**(a)**	Explain the term 'modelling' related to CAD with a suitable example.	**03**
	(b)	Briefly explain assembly modelling with a suitable example.	**04**
	(c)	Explain the mechanism simulation process with a suitable example.	**07**
Q.2	**(a)**	Explain the term 'simulation' in CAD with a suitable example.	**03**
	(b)	Discuss the need of the standard data formats in CAD with suitable example.	**04**
	(c)	Write short note on 'IGES - data exchange format in CAD'.	**07**
		OR	
	(c)	Write short note on 'STEP - data exchange format in CAD'.	**07**
Q.3	**(a)**	Define Finite Element Method.	**03**
	(b)	Briefly explain Discretization used in Finite Element Method with suitable example.	**04**
	(c)	Briefly explain the step by step procedure of finite element method with suitable example.	**07**
		OR	
	(a)	Explain mesh refinement with suitable example.	**03**
	(b)	Explain shape function used in finite element method with neat diagram.	**04**
	(c)	List various types of elements used in FEM and briefly explain any two with neat diagrams.	**07**
Q.4	**(a)**	Write down the expression of shape function N and displacement u for one dimensional bar element.	**03**
	(b)	Differentiate between boundary value problems and initial value problems.	**04**
	(c)	Derive the variational formulation of axial load problem	**07**
		OR	
	(a)	What are the characteristic of shape function?	**03**
	(b)	Explain the meaning dynamic analysis with suitable example?	**04**
	(c)	Explain the finite element formulation for 2D thermal problem with a neat diagram.	**07**

Q.5	**(a)**	Write the 3-dimensional Hook's law involving stress-strain with usual notations.	**03**
	(b)	Explain plane stress conditions with neat diagram.	**04**
	(c)	Derive the shape functions for a four-noded rectangular element using natural coordinate system	**07**

OR

	(a)	Explain the body forces in FEM analysis with a neat diagram.	**03**
	(b)	Explain plane-strain conditions with suitable example.	**04**
	(c)	Derive the shape function of a CST Element.	**07**

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