Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - VII EXAMINATION - WINTER 2025

Subject Code: 2171903 **Date: 13-11-2025**

Subject Name: Computer Aided Manufacturing

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.

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

			Marks
Q.1	**(a)**	Write control functions of CNC controller.	**03**
	(b)	With suitable diagrams, describe how the axes are identified in a lathe and a milling machine.	**04**
	(c)	Explain with a neat sketch the CIM wheel and describe various aspects of Computer Integrated Manufacturing.	**07**
Q.2	**(a)**	Explain the concept of part family in Group Technology. Discuss the different methods of identifying part families.	**03**
	(b)	Describe tool length compensation in CNC machining and illustrate it with a suitable diagram.	**04**
	(c)	What is a recirculating ball screw? Describe its construction and working with the help of a diagram.	**07**
		OR	
	(c)	Enumerate the types of feedback devices used in CNC systems and explain the operation of a rotary encoder with a neat sketch.	**07**
Q.3	**(a)**	What do you mean by absolute and incremental dimensioning? Explain both methods using neat sketches	**03**
	(b)	What is the composite part concept? Explain it in detail with suitable examples.	**04**
	(c)	Explain the need for a Flexible Manufacturing System (FMS). Describe various types of flexibilities associated with FMS.	**07**
		OR	
	(a)	Describe modal and non-modal codes used in CNC systems and provide examples for each type.	**03**
	(b)	Explain, with diagrams, the working principle of open-loop and closed-loop control systems.	**04**
	(c)	Explain the concept of Automated Guided Vehicles. List their types and discuss the advantages and disadvantages of each type.	**07**

Q.4	**(a)**	Explain the term 'robot' and briefly describe the factors to be evaluated before deploying robots in an organization.	**03**
	(b)	Explain the types of robotic grippers and describe four characteristics of a typical gripper.	**04**
	(c)	Discuss the important functions of process planning and explain the difficulties faced in manual process planning.	**07**

OR

	(a)	Describe various robotic joints and illustrate them with suitable diagrams.	**03**
	(b)	Define Programmable Logic Controller (PLC) and explain its functions briefly. Describe the composite part concept in detail.	**04**
	(c)	Sketch and explain the different FMS layout types and discuss their typical uses in manufacturing systems.	**07**
Q.5	**(a)**	Explain the difference between forward and inverse kinematics in robotics.	**03**
	(b)	Discuss the distinctions between MRP I and MRP II in manufacturing systems.	**04**
	(c)	List the common outputs generated by a Material Requirements Planning (MRP) system and illustrate them with a sample report.	**07**

OR

	(a)	Explain the basic concept and objectives of Just-In-Time (JIT) production system in brief.	**03**
	(b)	Describe the types of sensors and actuators commonly used in robotic manipulators.	**04**
	(c)	Describe the concept of Generative CAPP. Define inference engine and discuss the two approaches used in expert systems.	**07**

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