Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI EXAMINATION – SUMMER 2025

Subject Code: 3161917 **Date: 04-06-2025**

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)**	Explain the benefits of Computer Aided Manufacturing.	**03**
	(b)	Explain important G & M codes used in CNC Milling operations ?	**04**
	(c)	What do you mean by CIM? What are the benefits of CIM? Draw a CIM wheel.	**07**
Q.2	**(a)**	Explain tool radius compensation with example.	**03**
	(b)	Explain Axis designation in CNC machine tool with sketch.	**04**
	(c)	Write Canned cycle programme for Diameter Grooving for FIG.1.	**07**

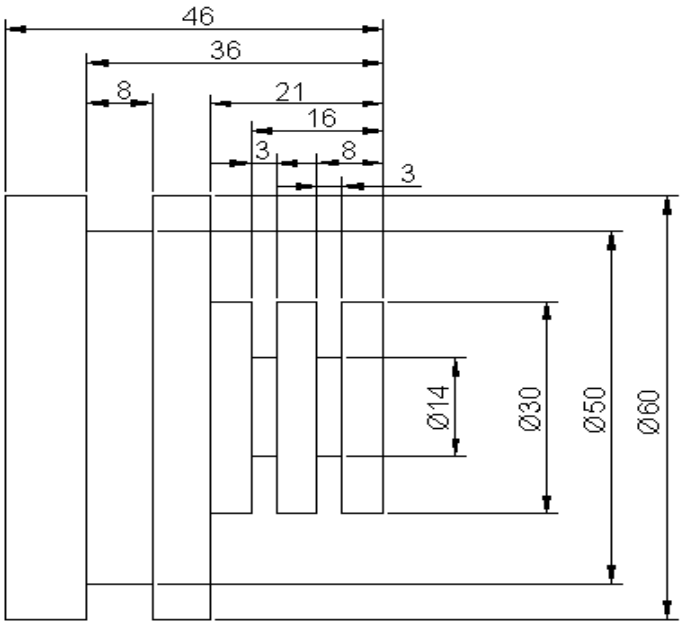

Figure 1

OR

	(c)	Write Canned cycle programme for Axial turning for FIG.2.	**07**

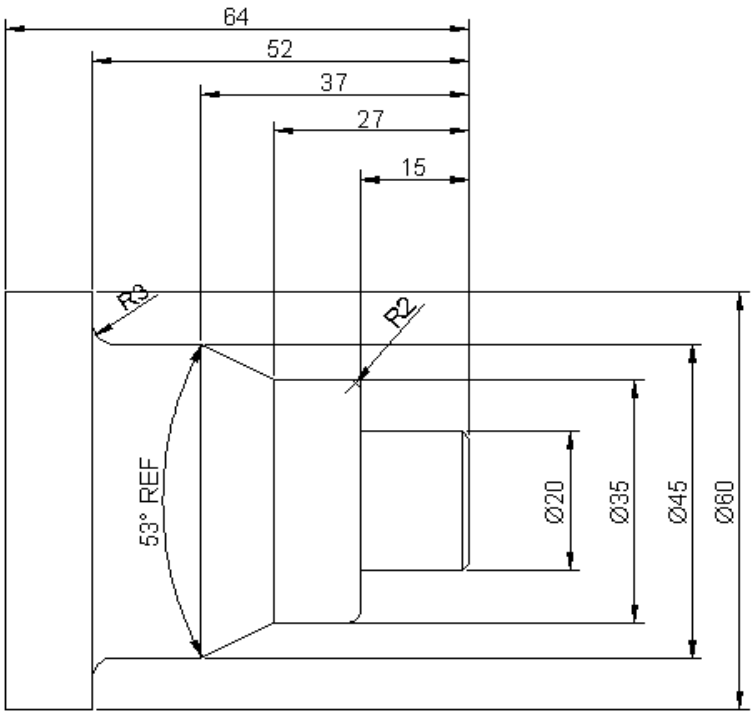

Figure 2

Q.3 **(a)** Explain canned drilling cycles. **03**

(b) Describe with sketch the working and construction of recirculating ball screw used in CNC machine tool. **04**

(c) Write the programme for circular pocketing CNC milling as shown in FIG.3. **07**

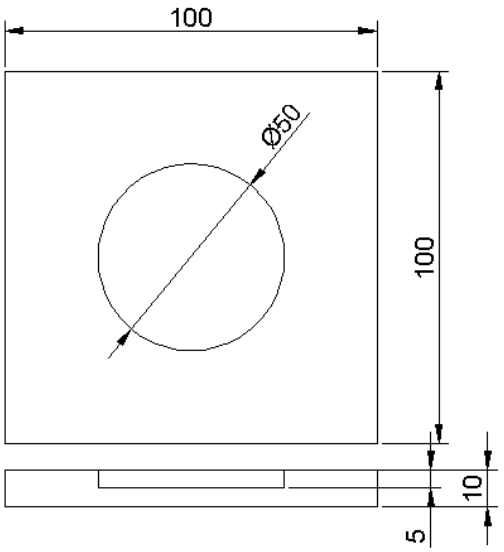

Figure 3

OR

Q.3 **(a)** Explain the open loop and close loop control system. **03**

(b) Explain the Generative type CAPP. **04**

(c) Write the programme for FIG 4 with mirroring function. **07**

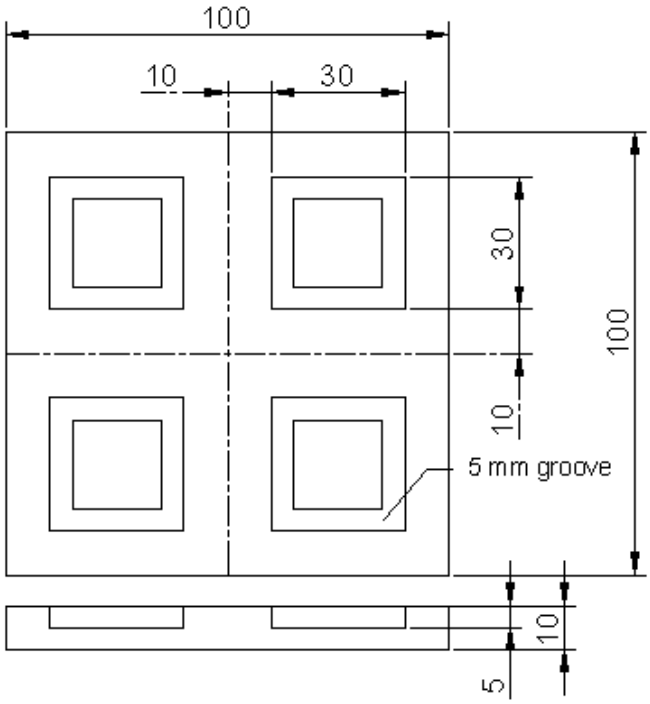

Figure 4

Q.4	**(a)**	Explain the conditions in which GT can be applied.	**03**
	(b)	Define JIT. Write the disadvantage of JIT.	**04**
	(c)	Explain OPITZ classification system in Group Technology?	**07**
		OR	
Q.4	**(a)**	Explain AND, OR, XOR, NOT, NAND, NOR logic gate	**03**
	(b)	Explain ladder programming in PLC with example.	**04**
	(c)	Explain the types of AS/RS and its applications	**07**
Q.5	**(a)**	What is MRP-II? Explain in brief.	**03**
	(b)	Explain the FMS layout configurations	**04**
	(c)	Explain the different types of flexibilities in FMS.	**07**
		OR	
Q.5	**(a)**	Draw the types of joints used in robots.	**03**
	(b)	Write a brief note on types of sensors used in robots.	**04**
	(c)	List the robot configurations and explain any two with neat sketch.	**07**

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Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3161917 Date:30-05-2024

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)**	What are the primary objectives of implementing CAM in manufacturing?	**03**
	(b)	Describe the basic architecture of a programmable controller (PLC)	**04**
	(c)	Describe the CIM Wheel to understanding the basic functions and components of a CIM system.	**07**
Q.2	**(a)**	Describe the axis designation system commonly used in CNC machines.	**03**
	(b)	Explain the classification of CNC machines based on their functions and applications.	**04**
	(c)	Explain working of recirculating ball screw. How does a recirculating ball screw contribute to the precision and efficiency of CNC machines?	**07**
		OR	
	(c)	Describe the concept of canned cycles in CNC programming and when they are typically used.	**07**
Q.3	**(a)**	What is a Flexible Manufacturing System (FMS), and how does it differ from traditional manufacturing systems?	**03**
	(b)	Name and define the various types of flexibility associated with Flexible Manufacturing Systems.	**04**
	(c)	What are Automated Guided Vehicles (AGVs), and where are they commonly used in industrial settings? Explain types of Automated Guided Vehicles (AGVs)	**07**
		OR	
Q.3	**(a)**	Explain the concept of a "cell" in FMS layout and its significance.	**03**
	(b)	Define Cellular Manufacturing and its role in improving production efficiency.	**04**
	(c)	Explain the concept of an Automated Storage and Retrieval System (AS/RS) and its advantages in modern warehousing.	**07**
Q.4	**(a)**	What is Production Planning and Control (PPC), and why is it essential in manufacturing?	**03**
	(b)	Enumerate the benefits of implementing Group Technology in manufacturing.	**04**
	(c)	Explain OPITZ system for part classification and coding.	**07**
		OR	
Q.4	**(a)**	Explain Material Requirement Planning (MRP).	**03**
	(b)	Discuss the applications of CAPP systems in modern manufacturing.	**04**
	(c)	Define rank order clustering and its significance in GT. How does rank order clustering assist in grouping similar parts together?	**07**

Q.5	**(a)**	Explain types of gripper used in robotics.	**03**
	(b)	Explain how the JIT philosophy can be applied to Flexible Manufacturing Systems (FMS) to reduce lead times and inventory.	**04**
	(c)	Explain the different methods of programming a robot, including teach pendant and offline programming.	**07**

OR

Q.5	**(a)**	Discuss the various power sources commonly used in robotic systems.	**03**
	(b)	What is a Management Information System (MIS), and what is its role in an organization?	**04**
	(c)	Describe the basic anatomy of a typical industrial robot, including its major components.	**07**

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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2023

Subject Code:3161917 Date:20-07-2023

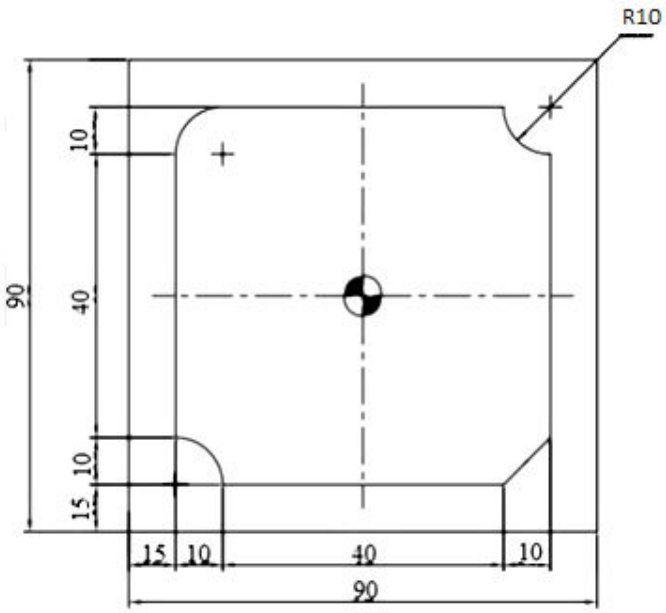
Subject Name:Computer Aided Manufacturing

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)**	List the advantages of Group Technology	**03**
	(b)	Draw the CIM wheel.	**04**
	(c)	Explain canned cycle with suitable example.	**07**
Q.2	**(a)**	List the benefits of FMS.	**03**
	(b)	Define robot and explain different joints used in robots.	**04**
	(c)	Explain the structure of robot in detail.	**07**
		OR	
	(c)	Write a manual part program for profile milling of the job as shown in fig. (Enable the cutter radius compensation)	**07**



Q.3	**(a)**	Explain the open loop and close loop control system.	**03**
	(b)	Discuss on automated guided vehicle	**04**
	(c)	Explain different types of FMS layout with neat sketch.	**07**
		OR	
Q.3	**(a)**	List the method to make part families. Explain any one in brief	**03**
	(b)	Give classification of CNC machine	**04**
	(c)	Explain the different types of flexibilities in FMS.	**07**
Q.4	**(a)**	Describe the terms with reference to Robot: 1. Payload, 2. Work envelop 3. Manipulator	**03**
	(b)	List the input and output devices for the PLC	**04**
	(c)	Discuss the problems with traditional production planning and control.	**07**

OR

Q.4 **(a)** Discuss the advantage and disadvantage of magnetic gripper. **04**

(b) Apply the rank order clustering technique to the part machine incidence matrix in the following table to identify logical part families and machine groups. Parts are identified by letters and machines are identified numerically. **10**

Machines	Parts								
	A	B	C	D	E	F	G	H	I
1	1								1
2		1					1		
3			1		1			1	
4		1				1	1		
5			1					1	
6						1	1		
7	1			1					
8			1		1				

Q.5 **(a)** Write advantages of JIT. **03**

(b) Explain incremental and absolute dimensioning with neat sketch. **04**

(c) What is CAPP? Explain Generative CAPP in detail. **07**

OR

Q.5 **(a)** Explain the PLC architecture using a diagram **03**

(b) Explain the various elements of CIM. **04**

(c) Explain MRP-I and MRP-II. **07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2022

Subject Code:3161917 Date:16/06/2022

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)**	Explain objective of CNC machine.	**03**
	(b)	Classify NC according to tool motion control system.	**04**
	(c)	Draw sketch of CIM enterprise wheel and compare with CIM wheel.	**07**
Q.2	**(a)**	Explain with neat sketch the operation of the canned cycle G81 as per ISO.	**03**
	(b)	Draw block diagram of PLC system and list the components of it.	**04**
	(c)	Prepare CNC milling part program for figure 1. (Thickness of plate is 15 mm)	**07**

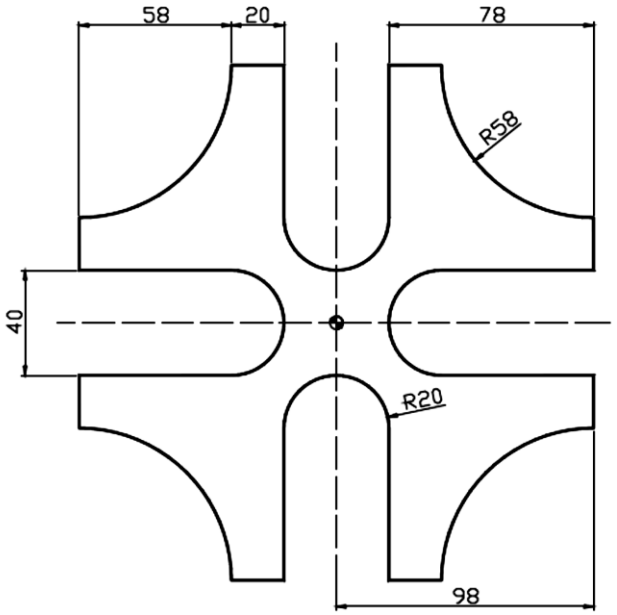

Figure 1

OR

	(c)	Prepare CNC turning part program for figure 2.	**07**

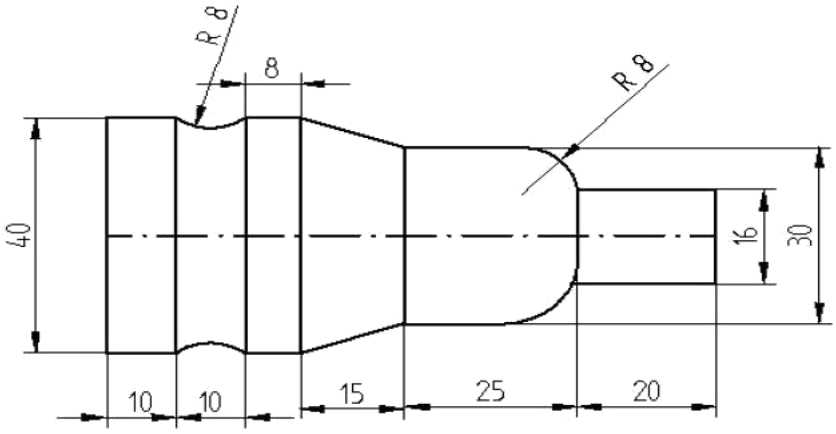

Figure 2

Q.3	**(a)**	What are the reasons for the successful application of robots in manufacturing industries?	**03**
	(b)	Explain objectives of parts classification and coding.	**04**
	(c)	What is computer aided process planning? Explain benefits over traditional process planning.	**07**

OR

Q.3	**(a)**	What are the various types of motion control possible in robots?	**03**
	(b)	Explain how hybrid codes are generated?	**04**
	(c)	Explain variant and generative approaches of CAPP.	**07**

Q.4	**(a)**	What are the steps to successful ERP implementation?	**03**
	(b)	What type of data needed in order to develop a flexible manufacturing cell?	**04**
	(c)	How do you justify the acquisition of a robot for a given application based on economics?	**07**

OR

Q.4	**(a)**	What is an ERP System and why is it used?	**03**
	(b)	What are the steps needed to develop the flexible manufacturing cells from scratch?	**04**
	(c)	Explain different sensors used in robot with neat sketch.	**07**

Q.5	**(a)**	In order to achieve the goal of JIT, which approaches can be followed?	**03**
	(b)	Explain any four components of production planning and control.	**04**
	(c)	What are the various guidance methods available for automated guided vehicle?	**07**

OR

Q.5	**(a)**	What is the philosophy of Just In Time?	**03**
	(b)	Explain planning phase of production planning and control.	**04**
	(c)	Explain the major components are used in an automated storage and retrieval system.	**07**

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