Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII(NEW) EXAMINATION – SUMMER 2019

Subject Code:2171903 **Date:27/05/2019**

Subject Name:Computer Aided Manufacturing

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. **Abbreviations have usual meaning.**

Q.1	**(a)**	Give three points each on advantages and disadvantages of CAM.	**03**
	(b)	Describe in short the types of manufacturing system used in industries.	**04**
	(c)	Explain open-loop control system used in a CNC system with a schematic diagram (include the drawback and application). Draw a block diagram of velocity control loop for a closed-loop control system.	**07**
Q.2	**(a)**	Draw a block diagram for retrieval type CAPP system.	**03**
	(b)	Figure 1 shows a 4-axes horizontal machining center. Designate its axes.	**04**
	(c)	Explain the principle of recirculating ball screw. Make a table of comparison between a conventional screw and a ball screw regarding load carrying capacity, travel speed, positioning, stiffness, friction, efficiency and maintenance.	**07**
		OR	
	(c)	First write a cut planning and then write a part program to drill a pattern of holes on a 15-mm thick plate as shown in Figure 2. Use subprogrm method. Cutting parameters are: tool number T02, speed 30 m/min, feed 50 mm/min. (Do not draw the given figure)	**07**
Q.3	**(a)**	When could you state that a manufacturing system is ‘flexible’? If there are any tests for checking this, name them.	**03**
	(b)	Brief about functions of computers in FMS. (Any four)	**04**
	(c)	What are the two major functions of tool monitoring systems? Explain various methods adopted for it.	**07**
		OR	
Q.3	**(a)**	Define PLC. Brief about the relay device components used in it.	**03**
	(b)	State points on role of manufacturing engineers in the CIM environment.	**04**
	(c)	Apply the rank order clustering technique to the PFA chart given in Figure 3.	**07**
Q.4	**(a)**	Define load capacity, degree of freedom, work volume for a robot system.	**03**
	(b)	Write a brief note on position sensors used in robots.	**04**
	(c)	Provide a comprehensive list of robot specifications with regard to (a) manipulator and (b) controller.	**07**
		OR	
Q.4	**(a)**	Explain the PLC architecture using a diagram.	**03**
	(b)	Enlist benefits of an FMS. State the associated limitations.	**04**
	(c)	What are the different work-space configurations of a robot? Explain any two with neat figures.	**07**
Q.5	**(a)**	What do you understand by bill-of-materials and master production schedule as required in an MRP system?	**03**
	(b)	What is MRP-II? Explain in brief.	**04**
	(c)	Elaborate on JIT production systems. How are these usefully associated with FMS?	**07**

OR

Q.5 **(a)** In block number 60 of a part program a linear interpolation is required to a target point (25.40, 12.50, --10.00) with feed rate 200 mm/min and coolant on. Write this block in fixed sequential format, tab sequential format and word address format. (Coordinates are in millimeters) **03**

(b) A 200-step stepper motor is directly connected to a 5-mm pitch ballscrew. Calculate the resolution of the axis. Also calculate number of pulses required to move the axis by a distance of 70.275 mm. What shall be the pulse frequency to the stepper motor in order to achieve a linear velocity of 210 mm/min? **04**

(c) Enumerate types of problems commonly encountered in planning and control of production when traditional PPC is employed. **07**

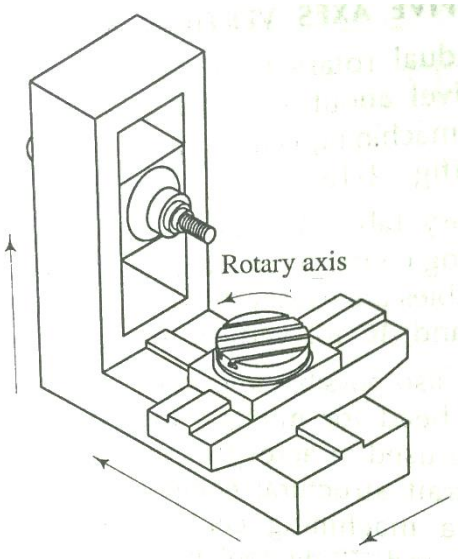

Figure 1

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

Figure 3

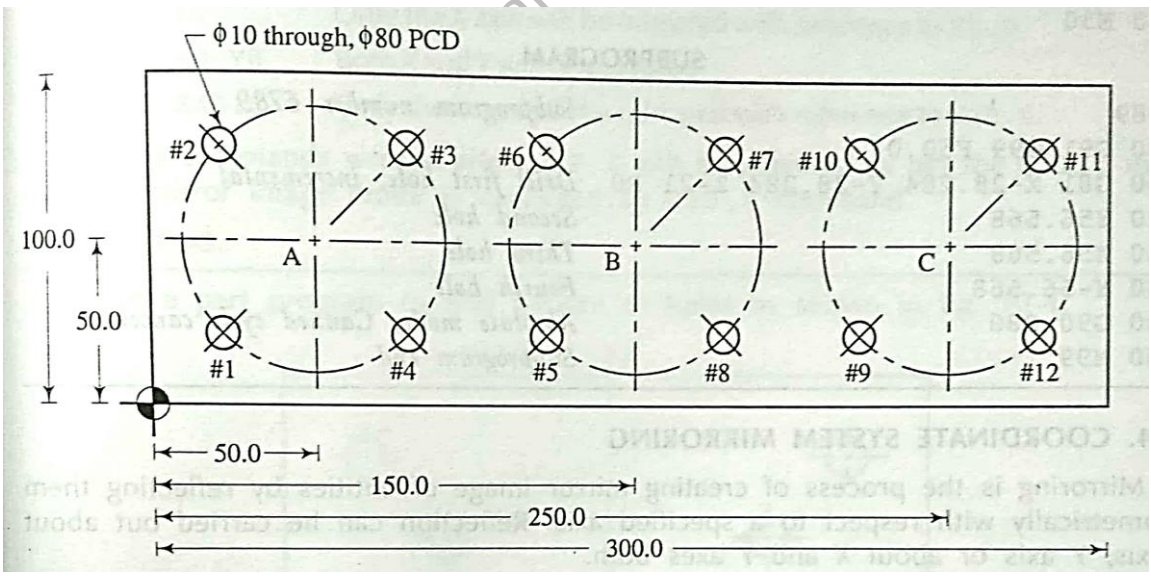

Figure 2

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