

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 subprogram 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**

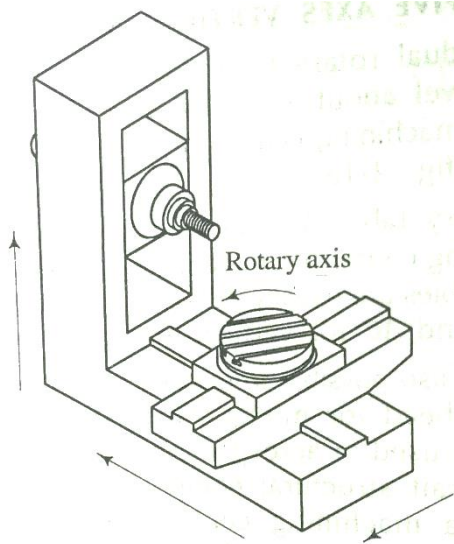


Figure 1

Machines	Parts								
	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

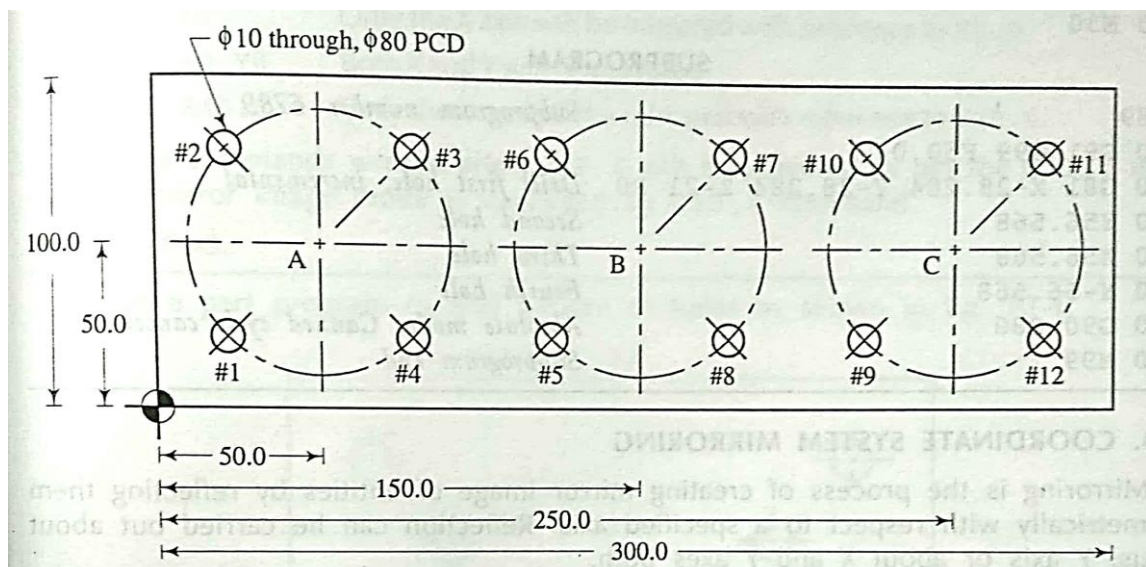


Figure 2
