Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII (old) - EXAMINATION - SUMMER 2017

Subject Code: 182002

Subject Name: Automated Manufacturing II

Time:10:30 AM to 01:00 PM

Total Marks: 70

Date:29/04/2017

Instructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- (a) Consider Cartesian manipulator with spherical wrist shown in figure 1. Where, P Q.1 07 is the end effector position. Using D-H notation Construct
 - 1. Set of robotic coordinate frame
 - 2. A table for joint parameter
 - 3. Each joint individual matrix



Figure 1. Cartesian manipulator with spherical wrist

- (b) Discuss the difference between spherical and articulated arm configuration. 07
- (a) A point $P(10,8,4)^T$ is attached to a frame (n,o,a) and is subjected to the **Q.2** 07 transformations described. Find the coordinates of the point relative to the reference frame at the conclusion of transformations.
 - (1) Rotation of 90° about the a-axis,
 - (2) Followed by a rotation of 90° about the o-axis,
 - (3) Followed by a translation of [9, -3, 4]
 - (b) What is an end effector? Which factor is considering design the end effector? 07

OR

- What is difference between powered leadthrough and manual leadthrough in **(b)** 07 robot programing?
- Q.3 **(a)** Explain in details tactile and touch sensors in robotic system and state their it 07 application
 - (b) Explain four basic components of flexible manufacturing system.

OR

- 0.3 (a) Difference between accuracy and repeatability in a robotic manipulator. 07 07
 - (b) Explain different types industrial application of robot.

07

- Q.4 (a) Five machines will constitute a GT machine cell. The From-To Data for the 07 machines are shown in the table below.
 - (a) Determine the most logical sequence of machines for this data according to Hollier method –I and construct the flow diagram for the data.
 - (b) Repeat step (a) using Hollier method II
 - (c) Compute the percentage of in sequence moves and percentage of backtracking moves in the solution for the two methods.
 - (d) Which method is better according to these measures? Suggest a suitable type of layout for the solution obtained by both the methods.

From	То						
	1	2	3	4	5		
1	10	10	80	0	0		
2	0	0	0	85	10		
3	0	10	0	10	0		
4	60	0	10	0	0		
5	0	75	0	20	10		

07

(b) What are the advantages and limitations of flexible manufacturing system?

OD	
UK -	

Q.4 (a) Apply the rank order clustering techniques to the part-machine incidence matrix 07 in the table that follows to identify logical part families and machine groups. Parts are identified by letters and machines are identified numerically.

Parts	Machines						
	1	2	3	4	5		
1	×		×		×		
2	×	×		×	×		
3	×	×		×	×		
4	×	×		×	×		
5	×		×		×		
6			×		×		
7	×		×		×		
8	×			×	×		
9	×	×		×			
10	×	X		×			

(b) Discuss briefly different type of flexibility used in FMS

- 07
- Q.5 (a) Explain the following term in GT: (1) mono code (2) poly code (3) mixed code.
 (b) What is CIM? What are the benefits and limitations of CIM?
 07

OR

- Q.5 (a) Differentiate between material requirement planning and capacity requirement 07 planning.
 - (b) Discuss the computerized elements of CIM systems and explain the briefly the 07 advantage that will be gained by implementation of CIM.
