Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) EXAMINATION – WINTER 2018

Subject Code: 2182002 **Date: 29/11/2018**

Subject Name: Automated Manufacturing - II

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.**

Q.1 **(a)** Define robot. Write down application of robot. **03**

(b) Difference between accuracy and precision in a robotic manipulator. **04**

(c) Consider Schematic of a Cylindrical robot with spherical wrist manipulator with a base frame and end-effector frame shown in figure 1. Using D-H notation Construct **07**

1. Set of robotic coordinate frame
2. A table for joint parameter
3. Each joint individual matrix

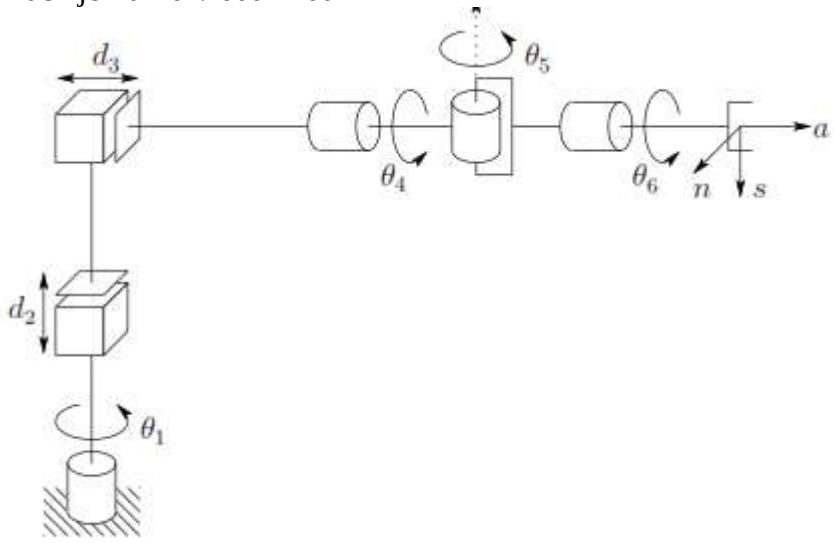

Figure 1. Cylindrical robot with spherical wrist manipulator

Q.2 (a) Define work volume and load carrying capacity of robot. **03**

(b) Explain in details vacuum and adhesive gripper in robot. **04**

(c) List and explain six end effector attachment.in robot. **07**

OR

(c) A point P $(8, 3, 2)^T$ is attached to a frame (n, o, a) and is subjected to the transformations described. Find the coordinates of the point relative to the reference frame at the conclusion of transformations. Also plot the coordinates in graphically. **07**

(1) Rotation of 90^0 about the y-axis,
(2) Followed by a rotation of 90^0 about the x-axis,
(3) Followed by a rotation of 90^0 about the z-axis
(4) Followed by a translation of [4,-3,7]

Q.3 **(a)** Derive the matrix that represents a pure translation about the reference frame. **03**

(b) Differentiate forward and inverse kinematics. **04**

(c) Consider the reverse transformation of a two joint manipulator shown in fig.1. Given the Length of the joint 1, L1=15cm, the length of joint2, L2=20cm, end **07**

effector position x=11.5cm and y=14.5cm, compute the joint angle θ_1 and θ_2 for robot.

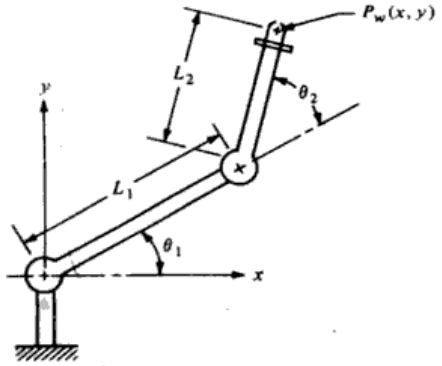

fig.2 Two joint robot manipulator

OR

Q.3 **(a)** Explain about importance of Robot Programming lead through programming. **03**

(b) Sketch a **TLL**, **TRL** and **RRR** configuration of a robot. **04**

(c) Explain a moving baseline tracking system and a stationary baseline tracking system in robot cell layout. **07**

Q.4 **(a)** Differentiate the flexible automation and fixed automation. **03**

(b) Explain with neat a sketch the optical proximity sensors. **04**

(c) Explain the rank order clustering techniques to the part-machine incidence matrix. **07**

OR

Q.4 **(a)** Explain the poly code in group technology. **03**

(b) Explain different types of MRP inputs and output of systems. **04**

(c) Five machines will constitute a GT machine cell. The From-To Data for the machines are shown in the table below. **07**

(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.

From	**To**				
	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

Q.5 **(a)** Differentiate between material requirement planning and capacity requirement planning. **03**

(b) Explain four basic components of flexible manufacturing system. **04**

(c) Explain in details MRP-II techniques. **07**

OR

Q.5 **(a)** Explain Production Flow Analysis (PFA). **03**

(b) Define the master production scheduling. Explain the factors that need to be taken into account while developing master production schedule **04**

(c) Explain the nature and role of the elements of the CIM system. **07**

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