GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER – VIII.EXAMINATION – WINTER 2016

Subject Code: 182002   **Date: 20/10/2016**

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)** Consider Stanford manipulator shown in figure 1. Using D-H notation   **07**
Construct
1. Set of robotic coordinate frame
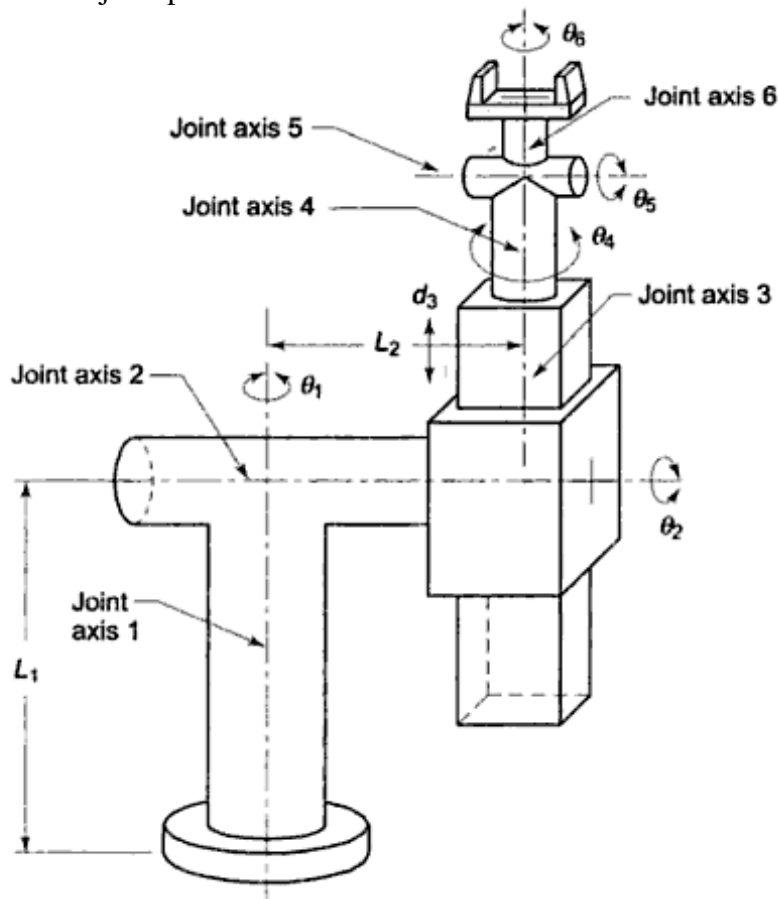2. A table for joint parameter

Figure 1. Stanford manipulator.

(b) Discuss the various type of robotics joints used in robots and state their   **07**
application.

Q.2 **(a)** A point $P(8,5,2)^T$ is attached to a frame (n,o,a)and is subjected to the   **07**
transformations described. Find the coordinates of the point relative to the
reference frame at the conclusion of transformations.

(1) Rotation of 90^0 about the a-axis,

(2) Followed by a rotation of 90^0 about the o-axis,

(3) Followed by a translation of [8,-3,4]

(4) Followed by a translation of [5,6,2]

(b) Give Euler angles representation for the RPY system and derive the rotation matrix. **07**

<div align="center">OR</div>

(b) State the difference between lead through programing and teach pendant programing in robotics system. **07**

Q.3 **(a)** Explain in details proximity and range sensors in robotic system and state their it application **07**

(b) Comparision of characteristics of robot drive systems. **07**

<div align="center">OR</div>

Q.3 **(a)** Classification of mechanical gripper according to type of kinematic device used to actuate the figure movement. **07**

(b) Explain in details types of robot work cells layout in robotics system. **07**

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

Parts	Machines				
	A	B	C	D	E
1	×		×		×
2	×	×		×	×
3	×	×		×	×
4	×	×		×	×
5	×		×		×
6			×		×
7	×		×		×
8	×			×	×
9	×	×		×	
10	×	×		×	

(b) What is a production flow analysis? Discuss various step involved in PFA **07**

<div align="center">OR</div>

Q.4 **(a)** Using MPS current inventory status and the product structure generate, the material requirement plan for the material M2 which is need in the component C2. Two units of M2 are required for one units of C2. **07**

Lead time are (in weeks)

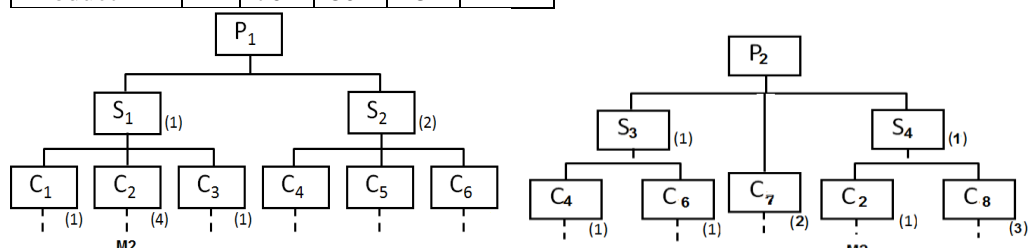P1, P2, S1, S4 – one week and C2,M2 – two week

Inventory status and order status

C2: inventory on hand =0, on order 50 due for delivery in week 3

M2: inventory on hand =150, on order 40 due for delivery in week 3

MPS

Week no.	6	7	8	9	10
Product P1			50		100
Product P2		70	80	25	

(b) Explain four basic components of a flexible manufacturing system. **07**

Q.5 **(a)** Explain in briefly Quantitative analysis of flexible manufacturing systems. **07**

(b) Differentiate between material requirement planning and capacity requirement planning. **07**

<div align="center">

OR

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Q.5 (a) Explain the following term in MRP-I **07**
1. Net requirements
2. Gross requirements
3. Planned order release

(b) Discuss the computerized elements of CIM systems and explain the briefly the advantage that will be gained by implementation of CIM. **07**

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