GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– VIII (New) EXAMINATION – WINTER 2019

Subject Code: 2182002   **Date: 29/11/2019**

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.

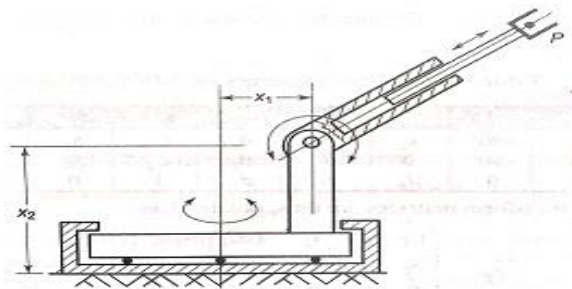|			**MARKS**
Q.1	**(a)**	Compare the parameters for given task to a human operator and a robot.	**03**
	(b)	Enlist different elements of robot with neat sketch and explain any two of them.	**04**
	(c)	Consider Schematic of a 3-DOF polar arm shown in figure 1. Using D-H notation Construct 1. Set of robotic coordinate frame, 2. A table for joint parameter 3. Each joint individual matrix	**07**

Fig.1. 3DOF Polar Arm

Q.2	**(a)**	Evaluate "Accuracy is an absolute concept, repeatability is relative".	**03**
	(b)	Classify the various types of grippers used in robot and explain magnetic grippers.	**04**
	(c)	Give suitable example of quality control in industry handled with the help of robotic vision system. Describe the set up and other requirements with the help of appropriate diagrams.	**07**

OR

	(c)	Why robot is called 24×7 worker? What is major advantage of a robot?	**07**
Q.3	**(a)**	Explain tactile sensors used in a robot.	**03**
	(b)	Write a short note on a robot used in spray painting application.	**04**
	(c)	Explain the rank order clustering techniques to the part-machine incidence matrix.	**07**

OR

Q.3	**(a)**	What are the objectives of cellular manufacturing?	**03**
	(b)	Explain the working principle of Hollier Method in deciding the sequence of machines and material flow.	**04**
	(c)	What is the part family in GT? Explain the design attribute and manufacturing attribute in GT.	**07**
Q.4	**(a)**	Explain the poly code in group technology.	**03**
	(b)	List the different flexibilities associated with FMS. Explain any two in brief.	**04**
	(c)	Basic Structure of the Opitz Parts Classification and Coding System.	**07**

1

Q.4 **(a)** Explain the concept of composite job in GT   **03**
(b) Difference between FMC and FMS.   **04**
(c) What is CIM? Explain with neat sketch CIM wheel?   **07**

Q.5 **(a)** Compare the different manufacturing system with respect to flexibility and production quantity.   **03**
(b) What are the advantages of Group Technology   **04**
(c) Differentiate between MRP I and MRP II   **07**

OR

Q.5 **(a)** Enlist the limitation of FMS.   **03**
(b) Explain the input parameter of MRP I system   **04**
(c) A flexible machining system consists of load/unload station and two machining work stations. Station 1 is the load/unload station. Station 2 performs milling operations and consists of two servers (two identical CNC milling machines). Station 3 has one server that performs drilling (one CNC drill press). The stations are connected by a part handling system that has four work carriers. The mean transport time is 3.0 min. the FMS produces two parts, A and B. the part mix fractions and process routings for the two parts presented in the table below. The operation frequency f_{ijk}= 1.0 for all operations. Determine (a) maximum production rate of FMS, (b) corresponding production rates of each product, (c) utilization of each station and, (d) number of busy servers at each station.   **07**

Part j	Part mix p_j	Operation k	Description	station i	Process time t_{ijk}(min)
A	0.4	1	LOAD	1	4
		2	MILL	2	30
		3	DRILL	3	10
		4	UNLOAD	1	2
B	0.6	1	LOAD	1	4
		2	MILL	2	40
		3	DRILL	3	15
		4	UNLOAD	1	2

****