Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII EXAMINATION – WINTER 2015

Subject Code:182002 Date:04/12 /2015

Subject Name: Automated Manufacturing-II

Time: 2:30pm to 5:00pm 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 spherical wrist to Cartesian manipulator 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

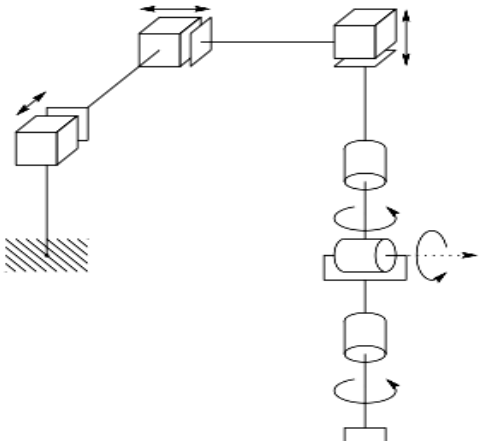


Figure 1. Spherical wrist to Cartesian manipulator.

(b) The information given in the mechanical gripper design of fig.1. Calculate the required actuating force if gripper force is to be 20kg. **07**

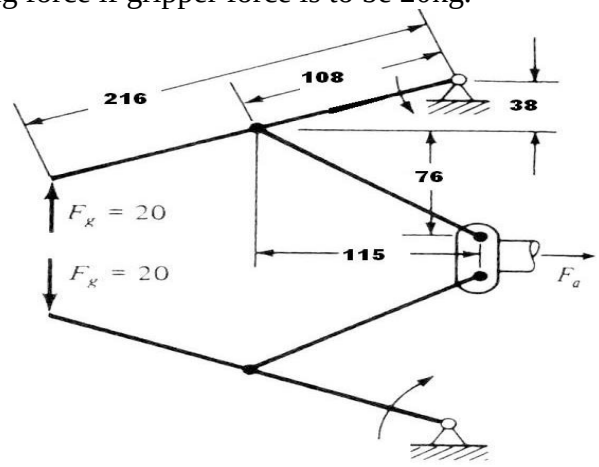


Fig .1 (all dimensions are in mm.)

Q.2 **(a)** Explain the different application of industrial robots and Describe the requirements of grippers in robots. **07**

(b) What are the different types of control systems used in Robots? **07**

OR

(b) With a neat sketch explain in details the optical Proximity sensor and write down application. **07**

Q.3 **(a)** Write down the homogenous transformation matrix. And also describe the X-axis rotational matrix with graphical view. **07**

(b) What are the factor considerations in workcell design? **07**

OR

Q.3 **(a)** Explain the two methods of robot programming. **07**

(b) Explain the three methods of economic analysis for robotics. **07**

Q.4 **(a)** The following table gives the information regarding the parts and the machines on which they are to be processed. **07**

1. Determine the similarity coefficients between all the machines.
2. Use Single Linkage Cluster analysis method and develop a dendrogram.
3. Use Rank order cluster technique.

Parts	**Machines**				
	A	B	C	D	E
1	1		1		
2	1	1		1	1
3	1	1		1	1
4	1	1		1	1
5	1		1		1
6			1		1

(b) What is the part family in GT? Explain the design attribute and manufacturing attribute in GT. **07**

OR

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

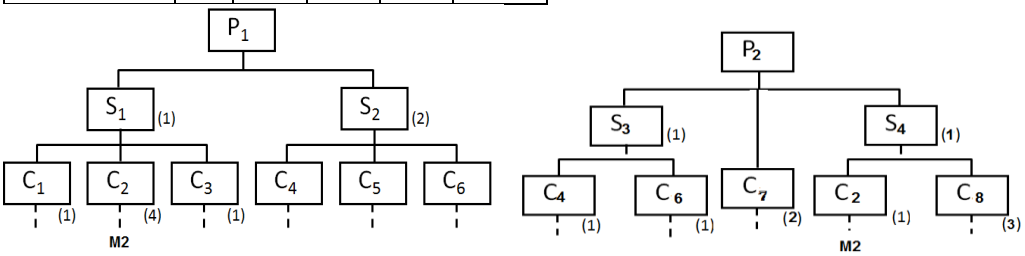
Inventory status and order status

C2: inventory on hand =0, on order 60 due for delivery in week 3

M2: inventory on hand =200, on order 50 due for delivery in week 3

MPS

Week no.	6	7	8	9	10
Product P1			50	60	70
Product P2		80		40	60



(b) Explain the different types of layout in FMS. **07**

Q.5 **(a)** What is the difference between a dedicated FMS and a random- order FMS? Name the four basic components in flexible manufacturing system. **07**

(b) Explain the MRP inputs and MRP outputs components in the system. **07**

OR

Q.5 **(a)** Why is master schedule important? How does master production schedule accommodate flexibility in manufacturing? **07**

(b) Describe the need for CIM and discuss the main elements of CIM systems. **07**

****