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06ME72

Seventh Semester B.E. Degree Examination, December 2011

Computer Integrated Manufacturing

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain different types of automation. **(06 Marks)**

b. Define the terms : i) Production capacity, ii) Manufacturing lead time, iii) Utilization. Write a mathematical equation for each. **(06 Marks)**

c. In a manufacturing plant, a part is produced in a batch size of 60 units. The batch must be routed through eight operations to complete it. Average setup time is 5 hr/operation and average operation time is 10 min. Average non operation time is 7 hours/operation. Determine :

i) Manufacturing lead time in number of days, if the plant runs one 8 hr shift/day.

ii) Production rate of the plant. **(08 Marks)**

2 a. What are the symbols used in an automated flow line? **(05 Marks)**

b. What are the reasons for implementing storage buffers in an automated production line? **(05 Marks)**

c. Sketch and explain the following work part transfer mechanisms :

i) Linear walking beam ii) Geneva wheel. **(10 Marks)**

3 a. Give the reasons for the downtime, on an automated production line. **(08 Marks)**

b. Discuss the limits of storage buffer effectiveness. **(06 Marks)**

c. A 22-station in-line transfer machine has an ideal cycle time of 0.55 min. the probability of station breakdown is p = 0.01. Average downtime = 8.0 min. per line stop. Use the upper bound approach and determine :

i) Ideal production rate ii) Frequency of line stops

iii) Average actual production rate iv) Line efficiency. **(06 Marks)**

4 a. Explain the reasons for partially automating the production line. **(04 Marks)**

b. Write a note on computerized line balancing. **(04 Marks)**

c. The table below shows the precedence relationships and element time for a new part. Ideal cycle time is 10 seconds. Construct the precedence diagram, using Kilbridge and Wester method. Compute the balance delay and line efficiency. **(12 Marks)**

Element Number	Predecessor element	Time (seconds)	Element Number	Predecessor element	Time (seconds)
1	-	5	7	6	2
2	1	3	8	7	6
3	2	4	9	6	1
4	1	3	10	6	4
5	4	6	11	10	4
6	3, 5	5	12	8, 9, 11	7

PART – B

5 a. Discuss the principles used in product design to facilitate automated assembly. **(10 Marks)**

b. Sketch any three escapement and placement devices. **(05 Marks)**

c. Explain the applications of AGV. **(05 Marks)**

6 a. With the help of a block diagram, explain retrieval CAPP systems. **(10 Marks)**

b. Describe inputs to the MRP system. **(10 Marks)**

7 a. Distinguish between machining centre and turning centre. Also mention their classification. **(05 Marks)**

b. The top view of a component is shown in Fig.Q7(b). Write a complete part program to mill the profile of the part. Part thickness is 15 mm and cutter diameter is 10 mm. Clearly show the target point of the tool and axes on the sketch of the part. Target point is (30, 30, 30) from left top corner of the part. Assume suitable data. **(15 Marks)**

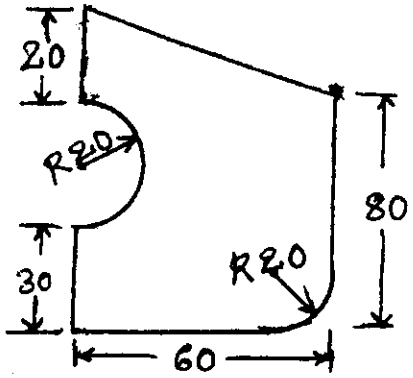

Fig.Q7(b)

8 a. With neat sketches, describe the geometrical configuration of a robot. **(12 Marks)**

b. Write a program for pick and place operation of a robot using VAL. Pick an object from the table and place it on the conveyor. Approach distance for the object on the table is 50 mm. Depart distance = 80 mm. Approach distance for the conveyor = 100 mm. Depart distance = 40 mm. Show the end effecter path. **(08 Marks)**

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