

10ME61

Sixth Semester B.E. Degree Examination, Dec.2014/Jan.2015
Computer Integrated Manufacturing

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART - A

- 1 a. Define CIM. Explain how flexible automation is differentiated from programmable automation. (05 Marks)
 b. Define manufacturing lead time and operation time. Represent them mathematically. (05 Marks)
 c. An average of 10 new orders is started through a certain factory each month. An order consists of an average 75 parts to be processed through 8 machines in the factory. The operation time per machine for each part is 25 min. The non operation time averages to be 10 hrs and the required setup time is 5hrs. There were 20 workstations in the factory. The plant operates 175hrs/month. Determine i) Manufacturing lead time ii) Plant capacity iii) Utilization iv) Work in process v) TIP ratio. (10 Marks)
- 2 a. What do you understand by automated flow line? List the various symbols used to represent an automated flow line. (06 Marks)
 b. Differentiate between In – line and Rotary configuration systems. (06 Marks)
 c. What are Transfer mechanisms? What are its types? With a neat sketch, explain Geneva wheel transfer mechanism. (08 Marks)
- 3 a. Differentiate between Upper Bound Approach and Lower Bound Approach. (05 Marks)
 b. Briefly explain the concept of manual assembly line, with a sketch. (05 Marks)
 c. A transfer machine has six stations that function as follows :

Station	Operation	Process Time (min)	P _i
1	Load part	0.78	0
2	Drilling	1.25	0.02
3	Reaming	0.90	0.01
4	Tapping	0.85	0.04
5	Milling	1.32	0.01
6	Unloading	0.45	0

In addition, Transfer Time is 0.18 min. Average downtime per occurrence = 8 min. Solve the problem assuming that, when station breakdown occurs, the workparts must be removed. Determine : i) Proportion Downtime ii) Average actual production rate. (10 Marks)

- 4 a. Define the following terms : i) Minimum rational work element ii) Balance delay iii) Cycle time iv) Precedence diagram. (08 Marks)
 b. The table below shows the element time and precedence relationships. Cycle time is 10 min. Construct the precedence diagram. Determine the number of workstations required to process all the work elements. Use ranked positional weight method. Also determine Balance delay.

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

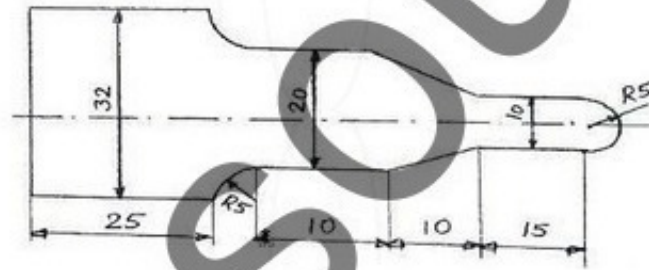
(12 Marks)

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PART - B

- 5 a. With neat sketches, explain Horizontal and Vertical escapement and placement devices. (08 Marks)
 b. What are Automated Guided Vehicles? List the types of AGV's. Write a note on vehicle guidance technology adopted in AGV's. (12 Marks)
- 6 a. Define CAPP. With block diagram, explain variant type of CAPP system. (08 Marks)
 b. Briefly explain the fundamental concepts of MRP. (06 Marks)
 c. What is Capacity Planning? Explain how capacity planning is generally accomplished. (06 Marks)
- 7 a. What are preparatory functions? Write a note on cutter radius compensation. (06 Marks)
 b. Differentiate between Absolute and Incremental co-ordinate systems. (04 Marks)
 c. The desired component part is shown in fig. Q7(c). Write a manual part programme to turn the profile of the part shown. Use Rough Turning Cycle and Finish cycle. Assume suitable process parameters. (10 Marks)

Fig.Q7(c)



- 8 a. With a neat sketch, explain spherical robot configuration. (06 Marks)
 b. What are End effectors? Explain the various types of grippers available. (08 Marks)
 c. Define the following :
 i) Resolution ii) Repeatability iii) Payload (06 Marks)
