ME - 6th Sec
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10ME61

Sixth Semester B.E. Degree Examination, June/July 2014

Computer Integrated Manufacturing

Time: 3 hrs. Max. Marks:100

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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PART – A

1 a. Define automation. Explain different types of automation system with examples. **(10 Marks)**

b. Explain the terms: i) Utilization; ii) Manufacturing lead time **(04 Marks)**

c. The average part produced in a certain batch manufacturing plant must be processed through an average of 6 machines. There are 20 new batches parts launched each week. Data for the average problem are as follows:

Average operation time = 6 min
Average setup time = 5 hours
Average non-operation time = 10 hours
Average batch size = 25 parts

There are 18 machines in the plant. The plant operates an average of 70 hours/week. Determine: i) Manufacturing lead time, ii) Plant capacity, iii) Plant utilization. **(06 Marks)**

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

b. Sketch and explain the following work part transfer mechanism:

i) Linear walking beam
ii) Geneva wheel
iii) Dial indexing machine **(15 Marks)**

3 a. In a eleven (11) station transverse line the probability of station breakdowns will occur for a given work part is equal to 0.02. This probability is same for all the 11 stations. Determine the frequency line stop/cycle on this flow line using upper bound approach and lower bound approach with an average production time = 1.6 min. Determine production rate. **(10 Marks)**

b. What is the purpose of buffer storage? State its effectiveness in automated flow line. **(06 Marks)**

c. Write a short note on partial automation. **(04 Marks)**

4 a. A project has the following tasks. Its immediate predecessor and the task times are given below. Using largest candidate rule balance the line and determine:

i) Number of work stations ii) Balance delay of line iii) Line efficiency.

Take T_c = 1 min.

Tasks	1	2	3	4	5	6	7	8	9	10	11	12
Preceded by	-	-	1	1, 2	2	3	3	3, 4	6, 7, 8	5, 8	9, 10	11
T_e (min)	0.2	0.4	0.7	0.1	0.3	0.11	0.32	0.6	0.27	0.38	0.5	0.12

(12 Marks)

b. Explain the following terms in line balancing;

i) Minimum rotational work element.
ii) Total work content time
iii) Cycle time
iv) Line efficiency. **(08 Marks)**

PART – B

5 a. Explain the design for automated assembly system. **(07 Marks)**

b. Explain with a neat sketch the elements of part feeding device. **(08 Marks)**

c. List the applications of AGVs. **(05 Marks)**

6 a. With a neat sketch explain retrieval 'CAPP' system. **(10 Marks)**

b. What is a material requirement planning? Explain various inputs and outputs to MRP system. **(10 Marks)**

7 a. Describe the advantages, disadvantages and applications of CNC machine tools. **(10 Marks)**

b. Explain the fundamental steps involved in development of part programming for milling and turning. **(10 Marks)**

8 a. Explain with sketches the common robot configuration. **(10 Marks)**

b. Explain the following:

i) Work volume

ii) Precision of movement

iii) End effectors in robots

iv) Repeatability **(10 Marks)**

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