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10ME61

Sixth Semester B.E. Degree Examination, June/July 2019

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. Define automation. Briefly explain different types of automation. (10 Marks)
- b. What are the reasons for automation? (02 Marks)
- c. Explain the following terms:

i) Manufacturing lead time	ii) Production rate
iii) Production capacity	iv) Utilization and availability

 (08 Marks)

- 2 a. What do you mean by automated flow line? Classify and explain the automated flow line system configuration. (10 Marks)
- b. Sketch and explain the following transfer mechanisms:
 - i) Walking beam transfer mechanism
 - ii) Geneva wheel mechanism
 (10 Marks)

- 3 a. Explain the upper bound approach and lower bound approach in analyzing automated flow line without storage buffer. (08 Marks)
- b. The following data applied to a 12-station In-line transfer machine. $P = 0.01$ (All station have an equal probability of failure)
 $T_c = 0.3$ min
 $T_d = 3$ min
 Using upper bound and lower bound approaches compute the following for the transfer machine:
 - i) The frequency of line stops
 - ii) The average production rate
 - iii) The line efficiency
 (08 Marks)
- c. What is mean by storage buffer? Mention two extreme cases of storage buffer effectiveness. (04 Marks)

- 4 a. Explain the following terms in line balancing:

i) Minimum rotational work element	ii) Precedence diagram
iii) Cycle time	iv) Balance delay

 (08 Marks)
- b. The following list defines the precedence relationships and element times for a new model toy.

Element	1	2	3	4	5	6	7	8	9	10
Time "Te" min	0.5	0.3	0.8	0.2	0.1	0.6	0.4	0.5	0.3	0.6
Immediate predecessors	-	1	1	2	2	3	4, 5	3, 5	7, 8	6, 9

Using largest candidate rule method:

- i) Construct the precedence diagram
- ii) If the ideal cycle time is to be 1 min what is the minimum number of workstations required?
- iii) Calculate the balance delay. (12 Marks)

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.

PART – B

- 5 a. Explain with sketches, the elements of the parts delivery system for an automated assembly line. (10 Marks)
- b. List the principles used in product design for automated assembly. (05 Marks)
- c. What is an automated guided vehicle system? List the applications of AGVS. (05 Marks)
- 6 a. Briefly explain:
i) Retrieval CAPP system
ii) Generative CAPP system (10 Marks)
- b. What is material requirement planning? Explain the structure of a MRP system. (10 Marks)
- 7 a. Describe salient features of CNC system along with a block diagram. (10 Marks)
- b. Discuss the advantages, disadvantages and application of CNC machines. (10 Marks)
- 8 a. With neat figures, briefly explain the common robot configurations. (12 Marks)
- b. Briefly explain the end effectors and sensors with respect to robots. (08 Marks)

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