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10MA72

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Automation in Manufacturing

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Define automation. Explain the types of automation with example. (10 Marks)
b. Explain in detail the reasons for automation in manufacturing system. (10 Marks)

- 2 a. Define manufacturing lead time, operation time production capacity, production rate and utilization and availability with there mathematical expression. (10 Marks)
b. An average of 10 new orders is started through a certain factory each month. An order consisting of an average of 75 parts to be processed through 8 machines in a factory. The operation time per machine in a 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 5 hrs. There were 20 work stations in the factory. The plant operates 175 hrs/month. Determine (i) Manufacturing lead time (ii) Production rate (iii) Plant capacity (iv) Utilization. (10 Marks)

- 3 a. Explain the different strategies to implement automation in production system. (10 Marks)
b. There are total 24 machines in the manufacturing plant and the parts produced in a batch must be processed through an average of 8 machines, 24 new batches are launched each week. Average operation time is 6 min, average batch size is 30 parts, average set up time is 6 hrs and average non-operation time per batch is 12 hrs/machine. The plant operates an average of 80 production hours per week and assume A = 95%. Determine
(i) Manufacturing lead time for an average part.
(ii) Production rate.
(iii) Plant capacity.
(iv) Plant utilization
(v) WIP
(vi) WIP ratio. (10 Marks)

- 4 a. What are the symbols used in an automated flow lines? (05 Marks)
b. Explain the upper bound and lower bound approach in analysis of transfer line without storage buffer. (08 Marks)
c. A 12 station transfer line has a cycle time of 48 sec and breakdown time of 3 min. The probability of failure at each station is given in the table below. Determine the efficiency of the line and production rate without storage buffer and when the line is divided into two stages. (07 Marks)

Station	1	2	3	4	5	6	7	8	9	10	11	12
P _i	0.02	0.03	0.02	0.02	0.04	0.03	0.02	0.03	0.03	0.04	0.02	0.03

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. Define Computer Aided Process Planning (CAPP). Explain with a block diagram retrieval type CAPP system. (10 Marks)
b. List the benefits of CAPP system. (05 Marks)
c. Explain commercially available CAPP software used in process planning. (05 Marks)
- 6 a. Define shop floor control and explain the three phases in shop floor control system with block diagram. (10 Marks)
b. What is the purpose of Factory Data Collection (FDC) system in shop floor control? Explain the manual data input technique, automated and semi automated data collection system. (10 Marks)
- 7 a. Explain the hierarchy of computer in manufacturing system with a block diagram. (10 Marks)
b. List the characteristics of LAN. (04 Marks)
c. Explain the following:
(i) Feed back control.
(ii) Adaptive control. (06 Marks)
- 8 a. What are the different trends in manufacturing? (10 Marks)
b. Describe the role of information system in automated factories. (05 Marks)
c. What will be the impact of future automated factory on labour? (05 Marks)

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