Seventh Semester B.E. Degree Examination, Aug./Sept.2020

Automation in 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. Explain the types of automation with example.

(10 Marks)

b. Explain in detail the reasons for automation in manufacturing system.

(10 Marks)

- a. Define manufacturing lead time, operation time production capacity, production rate and utilization and availability with their mathematical expression.
 - 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)
- 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. Differentiate between upper bound approach and lower bound approach.

(05 Marks)

b. What are the symbols used in an automated flow lines.

(05 Marks)

c. A transfer machine has 6 stations that functions as follows:

Station	Operation	Process time (min)	Pi
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 line is 0.18 min, average downtime occurrence is 8 min, Solve the problem assuming that, when station breakdown occurs, the work parts must be removed. Determine (i) Proposition downtime (ii) Average actual production rate. (10 Marks)

PART – B

5	a. b. c.	With the block diagram, explain variant type CAPP system. List the benefits of CAPP system Explain the commercially available CAPP software used in process planning.	(10 Marks) (04 Marks) (06 Marks)
6	a. b.	Define shop floor control. Explain the three phases in shop floor control. Explain the different methods of automatic identification system.	(10 Marks) (10 Marks)
7	a. b.	With the sketch, explain in detail the hierarchy of computers and manufacturing List the characteristics of LAN.	system. (10 Marks) (04 Marks)
	c.	Explain the following: (i) Feedback control (ii) Adaptive control	(06 Marks)
0		Explain in brief the different trends in manufacturing.	(10 Marks)
8	a. b.	What is the impact of automation on factories? Explain in brief.	(10 Marks)

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