

USN

--	--	--	--	--	--	--	--	--	--

10AU754

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Computer Integrated Manufacturing

Time: 3 hrs.

Max. Marks:100

- Note:** 1. Answer FIVE full questions, selecting at least TWO questions from each part.
2. Draw neat sketches wherever necessary.
3. Assume suitable data wherever required.

PART – A

- 1 a. Define the term automation and briefly explain the types of automation. (10 Marks)
b. A certain part is routed through six machines in a batch production plant. The setup and operation time for each machine are given in the following table.

Machine	Setup time (h)	Operation time (min)
1	4	5.0
2	2	3.5
3	8	10.0
4	3	1.9
5	3	4.1
6	4	2.5

The batch size is 100 and the average non-operation time per m/c is 12h.

- i) Determine the manufacturing lead time
ii) Determine the production rate for operation 3. (10 Marks)
- 2 a. Briefly explain the control functions with respect to its 3 parameters. (10 Marks)
b. Briefly sketch the symbols used in production system and briefly explain walking beam transfer mechanism with a neat sketch. (10 Marks)
- 3 a. Briefly explain the flow lines without storage buffer with respect to upper bound approach and lower bound approach. (14 Marks)
b. For a 10 station transfer line following data is given :
P = 0.01 (all stations have equal probability of failures)
 $T_c = 0.5$ min (cycle time)
 $T_d = 5.0$ min (Average down time).
Using upper bound approach, determine :
i) Frequency of line stops
ii) Average production rate
iii) Line efficiency (06 Marks)
- 4 a. Briefly explain following terms, cycle time, work station process time, mean rational work element, plant capacity. (10 Marks)

- b. The following list details the precedence relationships and element time for a new model.

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

- i) Construct precedence diagram
- ii) If the cycle time is 1 min, what is the theoretical number of stations required to minimize the balanced delay.
- iii) Compute the balance efficiency balance delay, station efficiency and idle time for each station using following method.
 - 1) Largest candidate rule and
 - 2) Kilbridge and Wasters method.

(10 Marks)

PART - B

- 5 a. Briefly explain the types of automated assembly system. (10 Marks)
- b. Define the term AGVS (automated guided vehicle systems) and briefly explain vehicle guidance and routing. (10 Marks)
- 6 a. With a neat sketch explain retrieval CAPP system. (10 Marks)
- b. Explain the fundamental concepts of MRP and inputs to MRP system. (10 Marks)
- 7 a. Briefly explain the need for CNC technology. (10 Marks)
- b. With a neat block diagram explain steps in manual part programming of CNC. (10 Marks)
- 8 a. With a neat sketch explain robot configurations. (12 Marks)
- b. Briefly explain sensors in robotics. (08 Marks)

* * * * *