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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Seventh Semester, B.E. - Mechanical Engineering

Semester End Examination; Dec - 2017 / Jan - 2018

Computer Integrated Manufacturing

Time: 3 hrs *Max. Marks: 100*

***Note**: i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.*
ii) Assume suitably missing data if any.

UNIT - I

1 a. Explain Manufacturing Lead Time, Production Capacity and Work In Process. How can you express them mathematically? 10

b. One million units of certain products are to be manufactured annually on dedicated production machines that run 24 hours per day, 5 days per week and 50 weeks per year.

(i) If the cycle time of a machine to produce one part is 1.0 minute, how many of the dedicated machines will be required to keep up with demand? Assume that availability, utilization and worker efficiency is equal to 100% and no setup time is lost 10

(ii) Solve part (i) Except that availability = 90%.

2 a. List the various symbols used to represent Automated Flow Line. 5

b. What are the reasons for implementing Buffer Storage System? 5

c. Sketch and explain the following work part transfer mechanisms : 10

(i) Linear walking Beam (ii) Geneva wheel.

UNIT - II

3 a. With examples, explain upper bound and lower bound approach to analyze automated flow line without storage buffer. 10

b. The following data applies to a 20 station In-line transfer machine. P = 0.01, T_C = 0.6 min, T_d = 9 min. Using upper bound approach. Compute; 10

(i) Ideal production rate (ii) Frequency of line stops

(iii) Actual production rate (iv) Line efficiency.

4 a. Explain the following terms in Line Balancing : 10

(i) Workstation Process Time (ii) Precedence Diagram

(iii) Balance Delay (iv) Cycle Time.

b. The table indicates the precedence relationships and element times for a product : 10

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

Contd….2

(i) Construct precedence diagram

(ii) If the cycle time is 1.0 min, determine the minimum number of station required

(iii) Compute the Balance Delay

Use Largest Candidate Rule method to balance the line.

UNIT - III

5	a.	List the principles used in product design for automated assembly.	6
	b.	With a neat sketch, explain Multistation In-line automated assembly system.	6
	c.	With a neat sketch, explain the concept of Selector and Orienter.	8
6	a.	With the help of a block diagram, explain variant type of CAPP system.	8
	b.	What do you mean by MRP? Explain the fundamental concepts of MRP.	6
	c.	List the various MRP output reports expected during planning and managing plant operations.	6

UNIT - IV

7	a.	Define AGV's. Briefly explain the functioning of the AGVS.	10
	b.	Describe Automated Storage and Retrieval System.	10
8	a.	List the desirable features for selecting a sensor used in automated systems.	5
	b.	With a neat block diagram, explain the components of PLC and also discuss its additional capabilities.	15

UNIT - V

9	a.	Explain the various categories of Automatic Identification and Data capture (AIDC).	10
	b.	Differentiate clearly between Bar codes and Radio frequency identification.	5
	c.	What are the advantages and application of CMM?	5
10	a.	With a neat sketch, explain any three types of CMM construction.	12
	b.	With a suitable sketch, describe the basic functions of a machine vision system.	8

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