

**Seventh Semester B.E. Degree Examination, December 2010**  
**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 and explain automation. Describe three basic types of automated manufacturing systems. (10 Marks)  
 b. Explain the mathematical model of product life cycle. (10 Marks)
- 2 a. Classify and explain work part transport mechanisms, with examples. (10 Marks)  
 b. Explain different types of control functions used in an automated flow line. (10 Marks)
- 3 a. Explain and differentiate between the upper bound and lower bound approach, with reference to the automated flow line. (10 Marks)  
 b. A 20 station transfer line is divided into two stages of 10 stations each. The ideal cycle time of each stage is  $T_C = 1.2$  min. All the stations in the line have the same probability of stopping,  $p = 0.005$ . Assume that the down time,  $T_d = 8.0$  min is constant when a breakdown occurs. Using the upper bound approach, compute the line efficiency for the following buffer capacities : i)  $b = 0$       ii)  $b = \infty$       iii)  $b = 10$       iv)  $b = 100$  (10 Marks)
- 4 a. Explain the following with reference to line balancing: (10 Marks)  
 i) Minimum rational work element      ii) Precedence diagram      iii) Balance delay  
 b. In a plant, a product is to be assembled as per the following data:  

Element	1	2	3	4	5	6	7	8	9	10
Time ' $T_e$ ' min	5	3	8	2	1	6	4	5	3	6
Immediate predecessor	-	1	1	2	2	3	4, 5	3, 5	7, 8	6, 9

  
 i) Construct the precedence diagram.  
 ii) If the cycle time is 10 min, find the number of stations required.  
 iii) Compute the balance delay of the line, using the largest candidate method. (10 Marks)

**PART – B**

- 5 a. Explain with neat sketches, the following part feeding devices of automated assembly systems: i) Vibratory bowl feeder      ii) Selector and orienter      iii) Escapement and placement devices (10 Marks)  
 b. Explain vehicle guidance methods used in AGV, for automated manufacturing systems. (10 Marks)
- 6 a. With a block diagram, explain the general procedure in a retrieval computer aided process planning system. (10 Marks)  
 b. Discuss the fundamental concepts and input to the MRP system. (10 Marks)
- 7 a. Describe salient features of CNC systems. (10 Marks)  
 b. Discuss the advantages and disadvantages of NC systems. (10 Marks)
- 8 a. With neat sketches, discuss the common robot configurations. (12 Marks)  
 b. Explain resolution, accuracy and repeatability, as applied to robots. (08 Marks)

