

**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 ' $T_c$ ' 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)

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.