10ME61

Sixth Semester B.E. Degree Examination, Dec.2015/Jan.2016
Computer Integrated Manufacturing

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting at least TWO questions from each part.*

PART – A

1. a. Define automation. Explain the different types of automation. List the reasons for automation. **(10 Marks)**
   b. In a certain factory an average of 20 new orders is processed every month, 50 parts are to be processed on an average for every order. The processing of the order is to be carried out through 10 machines in the factory. The operation time for machining each part is 15 mins, non-operation time per order at each machines is 8 hours, setup time per order is 4 hours, number of machines in factory is 25, number of hours of plant operation per month is 160 hours, percentage of machines operational at anytime is 80%, percentage of machines under repair and maintenance at anytime is 20%. Determine: (i) MCT, (ii) Production capacity, (iii) Plant utilization, (iv) WIP ratio. **(10 Marks)**

2. a. What is workpart transfer mechanism? With neat sketches, explain the different types of rotary transfer mechanism. **(10 Marks)**
   b. Briefly explain automation for machining operations. **(05 Marks)**
   c. Explain the control functions in an automated flow line. **(05 Marks)**

3. a. Explain the analysis of transfer lines with storage buffer. **(08 Marks)**
   b. What is partial automation? List the assumption made in analysis of partial automation. **(04 Marks)**
   c. In the operation of a certain 12 station transfer line the ideal cycle time is 8 min and the average downtime is 5 min. Determine the frequency of lines stops per cycle and also the production rate if the probability of station breakdown will occur at a rate of 0.0128. **(08 Marks)**

4. a. What is line balancing? Enumerate with an example explaining the Kilbridge and Wester method. **(10 Marks)**
   b. Explain the following terms in line balancing:
      i) Precedence diagram
      ii) Minimum rational work element **(04 Marks)**
   c. Explain briefly the workstation considerations. **(06 Marks)**

PART – B

5. a. With a neat sketch, explain the elements of part delivery system. **(10 Marks)**
   b. What is AGV? Explain the vehicle guidance systems in AGV. **(10 Marks)**

6. a. Define computer aided process planning. Explain retrieval type of process planning with the block representation. **(10 Marks)**
   b. Define material requirement planning. Explain the inputs to MRP system with a block diagram. **(10 Marks)**

7   a. The top view of the component is shown in Fig.Q7(a). Write the complete part program with respect to absolute programming to mill the profile of the part. Part thickness is 10 mm and cutter dia is 10 mm. Assume suitable data.
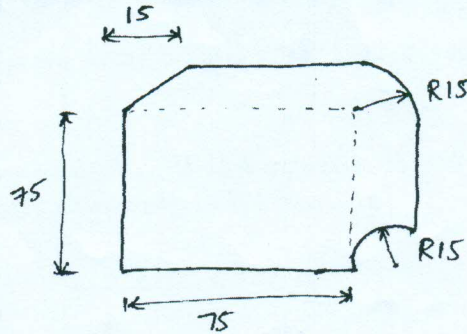

Fig.Q7(a)   **(15 Marks)**

   b. List the advantages and disadvantages of CNC machines.   **(05 Marks)**

8   a. Define a robot. With neat sketches, explain the different geometrical configurations of a robot.   **(10 Marks)**

   b. Briefly explain the industrial applications of robot.   **(10 Marks)**

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