USN | | | | | | | | | | |

06ME72

Seventh Semester B.E. Degree Examination, June/July 2013
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.

PART – A

1 a. Differentiate between automation and CIM. **(06 Marks)**

b. Define the following:
i) Manufacturing lead time.
ii) Production rate.
iii) Work in process.
iv) Utilization.
v) Availability. **(10 Marks)**

c. A production machine is operated 65h/week at full capacity. Its production rate is 20 units/h. During a certain week, the machine produced 1000 good parts and was idle the remaining time.
i) Determine the production capacity of the machine.
ii) What was the utilization of the machine during the week under consideration? **(04 Marks)**

2 a. Explain different types of work part transfer. **(06 Marks)**

b. Explain with neat sketches: i) Geneva wheel mechanism; ii) Walking beam mechani0sm. **(10 Marks)**

c. Write a note on buffer storage. **(04 Marks)**

3 a. Explain upper bound and lower bound approaches to analyze automated flow line without storage buffer. **(08 Marks)**

b. For a 10-station transfer line the following data is given: p = 0.01 (all stations have an equal probability of failure) T_c = 0.5 min, T_d = 5.0 min. Using the upper-bound approach and lower bound approach, determine: i) the frequency of line stops; ii) the average production rate; iii) the line efficiency. **(12 Marks)**

4 a. The following list defines the precedence relationships and element times for a new model toy:

Element	1	2	3	4	5	6	7	8	9	10
Te (min)	0.5	0.3	0.8	0.2	0.1	0.6	0.4	0.5	0.3	0.6
Immediate predecessors	-	1	1	2	2	3	4.5	3.5	7.8	6.9

i) Construct the precedence diagram for this job.
ii) If the ideal cycle time is to be 1.0 min, what is the theoretical minimum number of station required to minimize the balance delay.
iii) Compute the balance delay for the answer found in (ii).
iv) Determine the assignment of work elements to stations using largest-candidate rule.
v) How many stations are required?
vi) Compute the balance delay. **(15 Marks)**

b. Write a note on comsoal. **(05 Marks)**

PART – B

5 a. Explain with neat sketches carousel assembly system and single station assembly machine. **(10 Marks)**

b. A 12 station dial-type assembly line has an ideal cycle time of 0.2 min. The base part is automatically loaded to the first station and component's for assembly are added at each station. The fraction defect rate at each of the 12 stations is q = 0.01, and the probability that a defect will jam the line is m = 0.4, the average down time for every jam is 3 min. Determine: i) the average production rate; ii) the yield of good assemblies and defective assemblies; iii) the uptime efficiency of the line; iv) if the cost of operating the line is Rs.1500/hr, what is the cost per unit. Given raw material cost is Rs.60 and cost of tooling is Rs.5/unit. **(10 Marks)**

6 a. With a neat sketch, explain retrieval type of CAPP system. **(10 Marks)**

b. Explain the main components in a MRP system. **(10 Marks)**

7 a. Name the different types of CNC machining centres and explain any two. **(10 Marks)**

b. Prepare the manual part program for CNC turning operation using CANNED cycle, for the Fig.Q.7(b) shown below. Assume suitable data for machining parameters and toolings. Indicate the datum and meaning of G and M codes used in the program. **(10 Marks)**

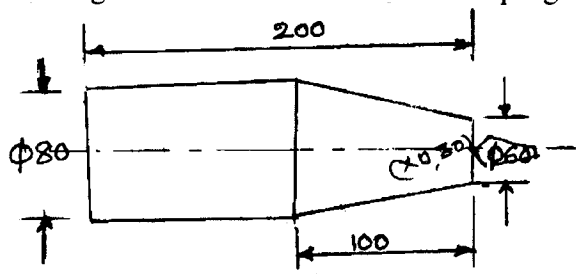

Fig.Q.7(b)

8 a. Explain the following configurations of industrial robots with neat sketches:
i) Polar co-ordinate system
ii) Cartesian co-ordinate system. **(10 Marks)**

b. Write a note on end effector. **(05 Marks)**

c. List the various applications of industrial robot. **(05 Marks)**

* * * * *