CLASS: **MTECH/PRE-PHD**   SEMESTER : II/NA
BRANCH: **PRODUCTION**   SESSION : SP/19

SUBJECT : PE511 COMPUTER INTEGRATED MANUFACTURING
TIME: **3.00 Hrs.**   FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Define CIM. Explain how flexible automation is differentiate from programmable automation.   [5]
Q.1(b) Explain the concept of CIM by means of CIM wheel. What are the benefits of CIM?   [5]

Q.2(a) What do you understand by automated flow line? List the various symbol used to represent an   [5]
automated flow line.
Q.2(b) The table below shows the element time and precedence relationship, cycle time is 10 min Construct   [5]
the precedence diagram. Determine the number of workstation required to process all the work
elements. Use the Large candidate rule. Also determine the Balance delay.

Work Element No.	1	2	3	4	5	6	7	8	9	10	11	12
Time (Min.)	5	3	4	3	6	5	2	6	1	4	4	7
Predecessor	-	1	2	1	4	3,5	6	7	6	6	10	8,9,11

Q.3(a) What are the various types of material handling and/or transportation systems used in FMS? Describe   [5]
their individual domains (areas) of applications for which they are used with their relative advantages
and disadvantages, if any.
Q.3(b) JJ is planning to integrate the AGVS and AS/RS with their FMS.JJ is interested is estimating the number   [5]
of AGVs required to satisfy the needs of the manufacturing system, that means the system must be
capable of making 51 deliveries per hour. JJ has already decided to install a laser guide path system
and the unit load AGVs adequately servers the company needs. The following data have been collected:
Vehicle speed = 180 m/min.   Average loaded travel distance/delivery = 540 m.
Average empty travel distance/delivery = 360 m, Pickup time = 0.50 min.
Drop-off time = 0.50 min.,   Traffic factor =0.85.

Q.4(a) Design and draw neat sketch of AS/RS system assume suitable data with the following requirements.   [5]
The unit load sizes are 0.6 m (width) X 0.5 m (length) X 0.5 m (height). The height clearance required
is 0.20 m, the length clearance is 0.15 m, the width clearance is 0.10 m and the number of units loads
per storage unit (u) is 2. The average cycle time of the operation of the S/T machine is 1 minute. The
system has total number of storage spaces equal to 10000. The system throughput expected is 420
operations (either storage or retrieval) per hour. Take the desired system height to be less than 20 m.
Take centre-to-centre rack support as 0.10 m, bay side support allowance as 0.10 m, clearance for the
crane run-out as 3m, clearance for the pickup/deposit area as 5 m, and aisle width as 2 m.
Q.4(b) Consider the following matrix of ten parts and five machines, form machine cells using ROC algorithm.   [5]

Machine	1	2	3	4	5	6	7	8	9	10
	COMPONENTS									
M1	1	1	1	1	1		1	1	1	1
M2		1	1	1					1	1
M3	1				1	1	1			
M4		1	1	1				1	1	1
M5	1	1	1	1	1	1	1	1		

Q.5(a) Explain briefly CIM data files and report formats for data management.   [5]
Q.5(b) Describe the salient features of MAP and TOP.   [5]