

14/05/19

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B.E / B. Tech (FULL Time) END SEMESTER EXAMINATIONS April / May 2019

B.E MECHANICAL ENGINEERING/B.E MECHANICAL ENGINEERING -TM  
Semester 7

ME8701 Computer Integrated Manufacturing

(Regulation 2012)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Differentiate between batch and job shop production.
2. Give examples of an automated system.
3. Define the term process plan.
4. Give any four application modules typically provided in a MRP II system.
5. Write any six Manufacturing attributes in Group Technology.
6. What is meant by Cellular Manufacturing?
7. List the four tests of flexibility in an automated manufacturing system.
8. State the factors that should be considered in selection of AGV.
9. What is meant by accuracy of robot?
10. What are the various joints in the Robot Systems?



Part - B ( 5 x 16 = 80 marks)

**(Question No.11 is Compulsory)**

11. A flexible machining cell consists of two machining workstations and a load/unload station. Station 1 is the load/unload station with one server (human worker). Station 2 consists of two identical CNC milling machines. Station 3 has one CNC drill press. The stations are connected by a part-handling system that has two work carriers. The mean transport time is 3 min. The FMC produces two parts, A and B. The part mix fractions and process routings for the two parts are presented in the table 1 below. The operation frequency  $f_{ijk} = 1.0$  for all operations. Determine (a) maximum production rate of the FMS, (b) corresponding production rates of each product, (c) utilization of each station, and (d) number of busy servers at each station. (4 x 4 = 16)

Table.1

part j	Part mix $p_j$	Operation $k$	Description	Station $i$	Process time $T_{cijk}$
A	0.4	1	Load	1	4
		2	Mill	2	30
		3	Drill	3	10
		4	UnLoad	1	2
B	0.6	1	Load	1	4
		2	Mill	2	40
		3	Drill	3	15
		4	UnLoad	1	2

12. a)
- i. Discuss the Computerized Manufacturing Support Systems of a CIM system. (8)
  - ii. Briefly discuss the information processing cycle in a manufacturing firm.(8)
- (OR)
- b)
- i. Write an engineering brief on the Automation migration strategy.(8)
  - ii. Briefly discuss the Pull system of production control. (8)
13. a) Summarize the Retrieval Computer Aided Planning Systems and Generative Computer Aided Planning Systems.(8+8)
- (OR)
- b) Assess an engineering brief on MRP I and MRP II.(8+8)
14. a) Apply the rank order clustering technique to the part-machine incidence matrix in the following table to identify logical part families and machine groups. Parts are identified by letters, and machines are identified numerically.

Table.2  
Parts

Machines	A	B	C	D	E	F
1	1				1	
2				1		1
3	1	1				
4			1	1		
5		1			1	
6			1	1		1



(OR)

- b) Five machines used to produce a family of parts are to be arranged into a GT cell. The from-to data for the parts processed by the machines are shown in the table below.
- Determine the most logical sequence of machines for this data. (5)
  - Construct the network diagram for the data, showing where and how many parts enter and exit the system. (4)
  - Compute the percentages of in-sequence moves, bypassing moves, and backtracking moves in the solution. (3)
  - Develop a feasible layout plan for the cell. (4)

Table.3

FROM	TO				
	1	2	3	4	5
1	0	10	80	0	0
2	0	0	0	85	0
3	0	0	0	20	0
4	70	0	20	0	0
5	0	75	0	20	0



15. a) Discuss any four common Robot Configurations in detail .(16)
- (OR)
- b) Discuss the various Robots control systems in detail. (16)