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B.E / B.Tech DEGREE END SEMESTER EXAMINATIONS, MAY 2013

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INUSTRIAL ENGINEERING

Semester VI

IE9352 Principles of Computer Integrated Manufacturing Systems

(Regulation 2008)

Time : 3 Hours Answer ALL Questions Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What is part family?
2. What are the system performance measures used in the 'bottleneck model'?
3. What are the applications of automated production lines?
4. Component cost associated with the operation of an indexing machine are as follows:
   Average production time = 1.0 Min
   Cost of raw work part = $ 0.35 / work piece
   Cost to operate the line = $ 0.5 / min
   Cost of disposable tooling = $ 0.02 / work piece
   Compute the average cost per work piece produced off the rotary indexing machine.
5. How product design and CAD are associated?
6. What are the three basic issues in the process of transferring information within CIM?
7. What are the three families of communicators under CIM?
8. What are the tools and techniques used in CIM communication?
9. Give some examples for manufacturing data.
10. What is the role of management in CIM?

Part – B (5 x 16 = 80 marks)

11. i) Why layered structure is desirable for communication? Explain the seven layer of OSI model.
    ii) Explain the characteristics of the basic network topologies with diagram.

12. a) i) Explain the classification and coding method used in part family formation.
    ii) 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.

				Parts					
Machines	A	B	C	D	E	F	G	H	I
1	1								1
2		1					1		
3			1		1			1	
4		1				1	1		
5			1					1	
6						1	1		
7	1			1					
8			1		1				

OR

b) i) Explain the components of FMS.

ii) Four 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. (a) Determine the most logical sequence of machines for this data using Hollier's method 2. (b) Construct the flow diagram for the data (c) Compute the percentage of in-sequence moves and the percentage of back-tracking moves in the solution.

	To:			
From:	1	2	3	4
1	0	10	0	40
2	0	0	0	0
3	50	0	0	20
4	0	50	0	0

13. a) i) Analyse an automated production line without storage buffer and derive expression for finding production rate.

ii) A transfer machine has six stations as follows:

STATION	OPERATION	p_i	PROCESS TIME (Min)
1	Load part	0	0.78
2	Drill three holes	0.02	1.25
3	Ream two holes	0.01	0.90
4	Tap two holes	0.04	1.42
5	Mill flats	0.01	1.42
6	Unload part	0	0.45

The time to transfer between stations = 0.28 min. If the part stops due to a jam in the line, it is removed as defective. It takes an average of 8 min to determine the fault and correct the problem and remove the part. Also, there

is a scheduled tool change every 40 parts which takes 6 min to complete. There are 20000 parts to be started onto the transfer machine.

A) How many defective parts will be removed from the line.?

B) How many total hours will be consumed in the manufacturing process?

C) Find the rate of production of acceptable parts.

OR

b) i) Explain the escapement and placement devices used in automated assembly systems?

ii) A 30-station transfer line has an ideal cycle time Tc = 0.75 min., an average downtime Td = 6.0 min. per line stop occurrence, and a station failure frequency p = 0.01 for all stations. A proposal has been submitted to locate a storage buffer between stations 15 and 16 to improve line efficiency. Using the upper-bound approach, determine: (a) the current line efficiency and production rate, and (b) the maximum possible line efficiency and production rate that would result from installing the storage buffer.

14. a) i) Explain the computerized elements of a CIM system.

ii) Explain the two methods of computer aided process planning.

OR

b) i) Explain the principles of lean production.

ii) What are the issues involved in reorganizing a production system for agility?

15. a) i) Explain about logical and physical views of data.

ii) Explain the types of data models.

OR

b) i) Explain RDBMS with an illustration.

ii) What is Expert system? How it is different from conventional programme?