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Second Semester M.Tech. Degree Examination, June/July 2016
Flexible Manufacturing Systems

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions.***

1 a. Explain different types and concepts of FMS. **(10 Marks)**
b. What is flexibility? Explain three levels of manufacturing flexibility. **(10 Marks)**

2 a. Explain the functions of FMS host computer, list advantages and disadvantages of FMS implementation. **(10 Marks)**
b. List different categories of FMS layout and explain ladder and open field layout. **(10 Marks)**

3 a. What is an AGV? Discuss various types of Automated guided vehicle systems (AGVS). **(10 Marks)**
b. Following are the data of AGV systems :
Vehicle velocity = 75m/min
Average distance traveled/ delivery = 225m
Average distance traveled empty = 150m
Pick up time = 75 sec
Drop off time = 75 sec
Traffic factor = 0.9
Determine the number of vehicles required to satisfy the delivery demand if the delivery demand is 50 deliveries per hour. Also determine the handling system efficiency. **(10 Marks)**

4 a. Define automated storage/retrieval system (AS/RS). List out difference between AS/RS and basic carousel storage system. **(08 Marks)**
b. Determine the single and dual command cycle times for the following unit load AS/RS. The length of storage aisle is 500m and its height is 100m. Horizontal and vertical speeds of storage/retrieval (S/R) machine are 625m/min and 150m/min respectively. The S/R require 30 seconds to accomplish pickup and delivery. **(08 Marks)**
c. List Carousel applications. **(04 Marks)**

5 a. What are the different mathematical techniques used for modeling and analysis of an FMS? **(10 Marks)**
b. Define Group technology. Explain benefits of GT to functional areas of manufacturing company. **(10 Marks)**

6 a. Four jobs 1, 2, 3, 4 are to be performed on each of five machine A, B, C, D and E in order A, B, C, D, E. Find total minimum elapsed time and ideal time of each machine. **(10 Marks)**

Job \ M/C	A	B	C	D	E
1	7	5	2	3	9
2	6	6	4	5	10
3	5	4	5	6	8
4	8	3	3	2	6

b. Option the optimal sequences for minimum make span for the flow shop schedule problem given below. Use Johnson algorithm and show the make span using Gantt chart. **(10 Marks)**

M/C \ Job	1	2	3	4	5	6
M/c 1	5	2	13	10	8	12
M/c 2	4	3	14	1	9	11

7 a. Explain Economic and technological justification for FMS as Group Technology (GT) and Just in Time (JIT) manufacturing. **(10 Marks)**

b. What is JIT? Explain different objectives and benefits of JIT. **(10 Marks)**

8 Write short notes on :

a. Tests of Flexibility

b. AGV Guidance Technology

c. Area of Application of a FMS in industry

d. Tool management in FMS. **(20 Marks)**

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