CODE NO: 07A81402 | R07 | SET No - 1

IV B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
FLEXIBLE MANUFACTURING SYSTEMS
(MECHANICAL ENGINEERING)
(MECHATRONICS)

Time: 3hours **Max. Marks: 80**

Answer any FIVE questions
All Questions Carry Equal Marks
- - -

1.a) List out the components of FMS and explain their role in FMS.
b) What are the objectives of FMS? [8+8]

2. How to achieve different types of flexibilities in FMS. [16]

3.a) Define group technology. What are the reasons for adopting GT?
b) With the help of a line diagram explain the layout of GT. [8+8]

4. Explain the algorithm of rank order clustering. [16]

5. A storage system serving electronics assembly plant consists of 3 stage carousels, each with its own P and D station. Each carousel has a track that is 60 m long and 3.5m wide. The speed at which the system revolves is 75 m/min. The P and D handling time is 0.40min. Determine the throughput rate of the storage system if the storage transaction and retrieval transactions are 4 equally divided during the shift. Assume bidirectional travel of the carousel. [16]

6.a) Explain the applications of FMS.
b) What are the benefits of FMS? [8+8]

7.a) Explain the basic principle of working of CMM.
b) Differentiate between contact and non-contact type of inspection technique. [8+8]

8.a) Differentiate between centralised and decentralised computer environment.
b) Explain the features of cell controller architecture for vertical and horizontal integration. [8+8]

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CODE NO: 07A81402	R07	SET No - 2

IV B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
FLEXIBLE MANUFACTURING SYSTEMS
(MECHANICAL ENGINEERING)
(MECHATRONICS)

Time: 3hours **Max. Marks: 80**

Answer any FIVE questions
All Questions Carry Equal Marks
- - -

1. Draw the line diagram indicating the system levels in an FMS host computer and explain their functions. [16]

2.a) With the help of a line diagram give the axes and format information of horizontal machining centre.
b) Explain the merits of vertical machining centre. [8+8]

3. Explain the steps involved in the development of coding system for GT. [16]

4. Following the data of AGV system:
Vehicle velocity = 45 m/min
Average distance travelled/delivery = 135 m
Pickup time = 45 sec
Drop off time = 45 sec
Average distance travelling empty = 90 m
Traffic factor = 0.9
Determine the number of vehicles required to satisfy the delivery demand if the delivery demand is 40 deliveries per hour. Also determine the handling system efficiency. [16]

5. The oval of a top-driven carousel track has a length = 50m and width = 4m. The speed of the carousel = 75 m/min. There are 100 carriers around the carousel and each carrier has 5 bins suspended from it. For a single direction carousel and a bidirectional carousel, compare how long it takes to retrieve 20 parts from the carrier if each part is in different storage bin and random storage is used in the carousel. Also determine the spacing between carriers and carousel. The handling time associated with retrieval is 20 seconds. [16]

6. Discuss about the factors to be considered while designing an FMS. [16]

7.a) List out the applications of CMM.
b) Explain the operational cycle of CMM. [8+8]

8. Discuss the features of various communication networks used in FMS. [16]

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CODE NO: 07A81402	R07	SET No - 3

IV B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
FLEXIBLE MANUFACTURING SYSTEMS
(MECHANICAL ENGINEERING)
(MECHATRONICS)

Time: 3hours **Max. Marks: 80**

Answer any FIVE questions
All Questions Carry Equal Marks
- - -

1.a) Discuss the factors influencing the FMS layouts.
b) List out aims of FMS. [8+8]

2.a) With the help of a line diagram give the axes and format information of Vertical machining centre.
b) Explain the merits of horizontal machining centre. [8+8]

3. Discuss how part families are identified and machine tools are grouped in production flow analysis. [16]

4.a) Briefly explain various types of FMS.
b) List out the areas of application of FMS. [8+8]

5. In order to determine the number of vehicles required to meet the demand for a particular automated guided vehicle system. The system must be capable of making 40 deliveries per hour. The following are the data of performance characteristics of the system.
Vehicle velocity = 150 m/min
Average distance travelled/delivery = 450 m
Pickup time = 0.75 min Drop off time = 0.75min
Average distance travelling empty = 300 m
Traffic factor = 0.9
Determine the number of vehicles required to meet the demand of delivery. Also determine the handling system efficiency. [16]

6. List out different types of FMS layouts? Explain them with the help of line diagram. [16]

7. Explain various methods of operating and controlling CMM. [16]

8. Explain the FMS host functional requirements. [16]

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CODE NO: 07A81402 | R07 | SET No - 4

IV B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
FLEXIBLE MANUFACTURING SYSTEMS
(MECHANICAL ENGINEERING)
(MECHATRONICS)

Time: 3hours **Max. Marks: 80**

Answer any FIVE questions
All Questions Carry Equal Marks
- - -

1. What are the different levels of automation? List out and explain. [16]

2. Explain the automated features and capabilities of machining centre. [16]

3. Discuss the advantages, disadvantages, limitations and obstacles of GT. [16]

4. An AGVS has an average travel distance per delivery = 500 m and an average empty travel distance = 300m. The system must make a total of 75 deliveries per hour. The load and upload times are both 0.5 min and the speed of the vehicles = 150 m/min. The traffic factor for the system = 0.85. Determine the average total time per delivery, the handling system efficiency and the resulting average number of deliveries per hour for a vehicle. How many vehicles are needed to satisfy the indicated deliveries per hour? [16]

5. Consider an operation of unit load AS/RS, which uses an S/R machine for each aisle of the system. The length of storage aisle is 300m and its height is 50m. Horizontal and vertical speeds of S/R machine are 400m/min and 75 m/min respectively. The S/R requires 30 seconds to accomplish pickup and delivery. Determine the single and duel command cycle times. [16]

6. What is FMS layout? Explain different material flow strategies used in FMS layout. What is the role of simulation in FMS layout configuration? [16]

7. With the help of a line diagram explain the constructional features and working of a CMM. [16]

8. With the help of a line diagram explain the system levels in an FMS. [16]

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