



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, M. Tech. - Mechanical Engineering

Semester End Examination; June - 2017

Flexible Manufacturing system

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- | | | |
|------|--|----|
| 1 a. | Define FMS. Explain three levels of manufacturing flexibility. | 10 |
| | b. Explain FMS applications and its benefits. | 10 |
| 2 a. | With a neat sketch, explain FMS layouts. | 10 |
| | b. Explain FMS project development steps. | 10 |

UNIT - II

- | | | |
|------|---|----|
| 3 a. | Explain different types of AGVS. | 10 |
| | b. Following are the data of AGV system : | |
| | Vehicle velocity = 45 m/min. | |
| | Average distance travelled/delivery = 135 m | |
| | Pick-up 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 delivers per hour. Also determine the handling system efficiency. | 10 |
| 4 a. | Explain Automated storage and retrieval system. | 10 |
| | b. 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 300 m and its height is 50 m. Horizontal and vertical speeds of S/R machine are 400 m/min and 75 m/min respectively. The S/R requires 30 sec. to accomplish pickup and delivery. Determine the single and dual command cycle times. | 10 |

UNIT - III

- | | | |
|------|--|----|
| 5 a. | With a sketch, explain DNC system. | 10 |
| | b. Briefly explain tool monitoring and fault detection. | 10 |
| 6 a. | With a block diagram, explain the working of CMM. | 10 |
| | b. With a neat sketch, explain basic functions of a machine vision system. | 10 |

UNIT - IV

- | | | |
|------|--|----|
| 7 a. | Explain Quantitative analysis in cellular manufacturing. | 10 |
|------|--|----|

- b. Define group technology. Give reasons for adopting group technology. 10
- 8 a. Explain Petri net modeling technique. 10
- b. Explain the benefits of group technology. 10

UNIT - V

- 9 a. How do you justify FMS based on economical and technological aspect? 10
- b. Explain scheduling procedure of FAS. 10
- 10 a. Explain the following flexible assembly systems hardware components :
 - (i) Processing stations
 - (ii) Material handling systems 10
 - (iii) Automated material storage and retrieval systems. 10
- b. Explain kanban system in Toyota production system. 10

* * * *