



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

(An Autonomous Institution affiliated to VTU, Belgaum)

**Seventh Semester, B.E. - Mechanical Engineering**

**Semester End Examination; Dec - 2016/Jan - 2017**

### Computer Integrated Manufacturing

*Time: 3 hrs*

*Max. Marks: 100*

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

*ii) Assume suitably missing data, if any.*

#### UNIT - I

- 1 a. Define automation. Explain different types of automation. 10
- b. The average part produced in a certain batch manufacturing plant must be processed through an average of six machines. There are 20 new batches of parts launched each week. Other pertinent data are as follows: Average operation time 6 min, Average setup time 5 hours, Average batch size 25 parts, Average non operation time per batch 10 hour. There are 18 machines in the plant operates on average of 70 production hours/week. Determine; 10
  - i) MLT
  - ii) Plant capacity
  - iii) Plant utilization.
- 2 a. Discuss with examples types of automated flow lines also list the objectives of automated flow line. 10
- b. Sketch and explain the working of Geneva wheel mechanism. 10

#### UNIT - II

- 3 a. Explain with examples upper bound and lower bound approaches to analyse automated flow line 10
- b. The ideal cycle time of a 16 station transfer line is 1.4 min, the average down time per line will be 6 min and the probability of breakdowns /cycle is equal for all cycle and is equal to 0.004. Determine production rate and line efficiency by considering both upper and lower bound approaches. 10
- 4 a. Explain the following terms :
  - i) Balance delay
  - ii) Cycle time 10
  - iii) Precedence diagram
  - iv) Minimum rational work element.
- b. Explain with mathematical expressions different terms in line balancing. 10

#### UNIT - III

- 5 a. Explain with neat sketch the following part feeding devices of automated assembly system,
  - i) Escapement and placement devices 12
  - ii) Vibratory bowl
- b. Discuss the principles used in product design to facilitate automated assembly. 8

- 6 a. With a block diagram, explain the general procedure in a retrieval computer aided process planning system. 10
- b. Discuss the fundamental concepts and input to the MRP system. 10

**UNIT - IV**

- 7 a. Explain a type of AGV's used for automated manufacturing system. 10
- b. Explain different material handling systems. 10
- 8 a. Explain briefly : 10
  - i) Sensors
  - ii) Actuators.
- b. Explain types of automated storage and retrieval system. 10

**UNIT - V**

- 9 a. Explain Radio frequency identification method. 10
- b. Explain Bar code Technology. 10
- 10 a. Explain different structures of CMM with the help of simple sketches. 15
- b. Differentiate between Contact and Non-contact type of inspection methods. 5

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