



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

(An Autonomous Institution affiliated to VTU, Belgaum)

Third Semester, M. Tech. - Mechanical Engineering (MCIM)

Semester End Examination; Dec - 2016/Jan - 2017

Industrial Automation

Time: 3 hrs

Max. Marks: 100

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

ii) Use of Statistical Quality Control Factor data sheets/Book is permitted.

UNIT - I

- 1 a. Explain the USA principle of Automation. 10
- b. Name the different categories of material transport equipments. Give their features and applications. 10
- 2 a. Explain briefly the strategies for Automation and Process Improvement. 10
- b. Explain briefly the different AIDC technologies. Give their applications. 10

UNIT - II

- 3 a. List the distinct manufacturing systems along with their features. 10
- b. Compare continuous control and discrete control. 10
- 4 a. What are the issues of planning and design of FMS? Explain briefly. 10
- b. List desirable features for selecting measuring devices. 10

UNIT - III

- 5 a. Sketch and explain various part feeding devices. 10
- b. Write diagrammatic representation of shop floor control system. Explain the three important phases. 10
- 6 a. Sketch and explain different AGV systems. 10
- b. Mention the different types of factory data collection systems along with their limitations. Explain briefly various structures of Automated FDCS terminals. 10

UNIT - IV

- 7 a. List the SPC tools. Explain the Pareto diagram. 10
- b. A precision industry manufactures leads for a drafting instrument. The diameter of eight samples (m) of size (n) 5 was measured for each part. Determine the control limits and show that the process is under control. The calculated values of \bar{X} and R values are given in Table 7b. The statistical constants are $A_2 = 0.577$, $D_3 = 0$, and $D_4 = 2.114$ for a sample size of 5. 10

Table 7b.

S	1	2	3	4	5	6	7	8
\bar{X}	2.008	1.998	1.993	2.002	2.001	1.995	2.004	1.999
R	0.027	0.011	0.017	0.009	0.014	0.020	0.024	0.018

- 8 a. Explain cause and effect diagram with an illustration. 8
- b. What is CMM? Explain its construction. 12

UNIT - V

- 9 a. Write the structure of MRP system and explain. 10
- b. What is CAPP? Explain Retrieval CAPP. 10
- 10 a. List the outputs of MRP. 8
- b. What is the capacity planning? Explain the two stages clearly. 12

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