



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

(An Autonomous Institution affiliated to VTU, Belagavi)

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

Semester End Examination; Dec - 2017 / Jan - 2018

Industrial Sensors and Analysis Technique

Time: 3 hrs

Max. Marks: 100

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

UNIT - I

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|------|---------------------------------------------------------------------------------------|----|
| 1 a. | With a neat sketch, explain the principle of operation of inductive proximity sensor. | 10 |
| | b. Discuss the characteristics and working principle of microwave sensor. | 10 |
| 2 a. | With a neat sketch, explain the detection modes used by photoelectric sensors. | 10 |
| | b. With a relevant sketch, explain the open loop and closed loop control system. | 10 |

UNIT - II

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|------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 3 a. | Discuss the software problems in evaluation of an existing flexible manufacturing cell using a sensing network. | 10 |
| | b. Briefly explain the functional parameters in manufacturing system, sensors and control systems that are used to design manufacturing facilities. | 10 |
| 4 a. | With a neat block diagram, explain how message movement takes place with a computer network? | 10 |
| | b. With an example, explain the working of RS232 based networks. | 10 |

UNIT - III

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|------|------------------------------------------------------------------------------------------------------------|----|
| 5 a. | Sketch and explain the working of ultrasonic stress sensor measuring dynamic changes in materials. | 10 |
| | b. With the help of a block diagram, explain the data flow in an automatic bearing fault detection system. | 10 |
| 6 a. | With a neat sketch, explain the working of optoelectronic sensor in tracking targets on a structure. | 10 |
| | b. With a neat sketch how sensors are used in measuring vibrations in a structure? Explain. | 10 |

UNIT - IV

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|------|------------------------------------------------------------------------------------------------------------------|----|
| 7 a. | Briefly explain semiconductor temperature detector using photoluminescence. | 10 |
| | b. Explain the control of input/output speed of continuous web fabrications using laser doppler velocity sensor. | 10 |
| 8a. | Explain the use of flow sensors in detecting small air bubbles for process control in manufacturing. | 10 |
| | b. Briefly explain how the piezoelectric crystals and strain gauges are used as pressure sensor. | 10 |

UNIT - V

- 9 a. Explain the working of end effectors camera sensor detecting partially visible objects. 10
- b. Briefly explain the conditions that govern the performance of sound vision recognition sensors in robot end effectors. 10
- 10 a. Explain the working of linear variable displacement transformer sensor in robot end effectors. 10
- b. Explain the basic parameters of end effectors camera sensor used for edge detection and extraction. 10

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