



**P.E.S. College of Engineering, Mandya - 571 401**  
*(An Autonomous Institution affiliated to VTU, Belgaum)*  
**Seventh Semester, B.E. – Industrial and Production Engineering**  
**Semester End Examination; Dec - 2016/Jan - 2017**  
**Mechatronics**

Time: 3 hrs

Max. Marks: 100

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

**UNIT - I**

- |      |   |   |
|------|---|---|
| 1 a. | With neat sketch, explain elements of closed loop system.       | 6 |
|      | b. List out the advantages and limitations of mechatronics.     | 6 |
|      | c. Explain with neat diagram, Engine Management System.         | 8 |
| 2 a. | With neat sketch, explain eddy current proximity sensors.       | 7 |
|      | b. Explain with diagram, working principle of automatic camera. | 8 |
|      | c. Discuss the evolution of mechatronics.                       | 5 |

**UNIT - II**

- |      |   |    |
|------|---|----|
| 3 a. | Explain the following with sketches;                    |    |
|      | i) Diodes   | 10 |
|      | ii) Thyristors.   |    |
|      | b. Discuss MOSFET with sketches.                        | 10 |
| 4 a. | Explain the working principle of following D.C. motors; |    |
|      | i) Series wound motor                                   | 10 |
|      | ii) Shunt wound motor.                                  |    |
|      | b. Discuss the specification of stepper motor.          | 10 |

**UNIT - III**

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|------|--|----|
| 5 a. | Differentiate between microprocessor and micro controller.               | 6  |
|      | b. With a neat diagram, explain the general microprocessor architecture. | 10 |
|      | c. Discuss on Data bus.  | 4  |
| 6 a. | Explain ROM, RAM and EPROM.  | 10 |
|      | b. With neat diagram, explain micro controller.                          | 10 |

**UNIT - IV**

- |      |  |    |
|------|--|----|
| 7 a. | Explain:   |    |
|      | i) AND gate      ii) NOT gate and NAND gate with neat sketches.          | 12 |
|      | b. Define number system with an example.                                 | 8  |
| 8 a. | Define signal condition and briefly explain signal conditioning process. | 10 |

- b. Discuss the following : 10
    - i) Low pass            ii) High pass            iii) Band pass filters.
- UNIT - V**
- 9 a. With neat diagram, explain flat and dove tail and friction guideways. 8
  - b. With neat sketch, explain recirculating ball screw and nut. 8
  - c. Explain the concept of stick-slip phenomenon. 4
  - 10 a. Define bearing. With neat sketch, briefly explain different types of bearing used in design of spindle bearing. 10
  - b. Explain the concept of preloading of ball nut. 6
  - c. Summarize on planetary roller screw. 4

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