



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

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Mechanical Engineering

Semester End Examination; Dec. - 2019

**Mechatronics and Microprocessor**

Time: 3 hrs

Max. Marks: 100

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

## UNIT - I

- 1 a. Define Mechatronics and with a block diagram explain the engine management system. 10  
 b. Compare open loop and closed loop control system with a neat diagram, explain generalized measurement system. 10
- 2 a. Define sensor. Explain principle and working of Eddy current proximity sensor with a neat sketch. 10  
 b. Explain principle and working of Hall-effect sensor with an example and neat sketch. 10

## UNIT - II

- 3 a. Explain working principle of brushless permanent magnet DC motor with a neat sketch. 10  
 b. Explain: i) Bipolar transistors ii) Solenoids. 10
- 4 a. Explain with a neat diagram single phase induction motors. 10  
 b. Explain principle and working of variable reluctance stepper motor with a neat sketch. 10

## UNIT - III

- 5 a. Explain the process of converting ADC signals. 10  
 b. What is pulse modulation? Explain the two types of modulations. 10
- 6 a. What is data acquisition? Explain with a block diagram the DAQ system. 10  
 b. Explain different filters with frequency versus gain curves along with their characteristic curve. 10

## UNIT - IV

- 7 a. What is a microcontroller? Explain organization of microcontroller. 10  
 b. Explain High level, Assembly and Machine level language programming. 10
- 8 a. What are the types of registers used in 8085 microprocessor? Explain any three registers. 10  
 b. Draw a neat layout of architecture of INTEL 8085A microprocessor. 10

## UNIT - V

- 9 a. What are logic gates? Explain AND, OR and NOT gates with symbols and truth table. 10  
 b. With a proper example, explain how a negative number is represented in binary number system? 10
- 10 a. Write a circuit symbol and truth table for NAND, NOR and X-OR gates. 12  
 b. Convert;  
 i) 10011 to decimal ii)  $4161_{(8)}$  into binary 8  
 iii)  $F6D9_{(16)}$  to decimal iv)  $1011010111_{(2)}$  to hexadecimal