



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

(An Autonomous Institution affiliated to VTU, Belagavi)

Seventh Semester, B.E. - Industrial and Production Engineering

Semester End Examination; Dec - 2017/Jan - 2018

Mechatronics

Time: 3 hrs

Max. Marks: 100

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

UNIT - I

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| 1a. What is a control system? Explain Open loop and Closed loop systems with suitable example. | 8 |
| b. Discuss a measurement system and its constituent elements. | 8 |
| c. State merits and demerits of Mechatronics. | 4 |
| 2 a. Explain with the block diagram, how a microprocessor control system is used to control the focusing and exposure in an automatic camera? | 10 |
| b. Explain with a neat sketch, an eddy current proximity sensor. | 6 |
| c. Define the following terms : | |
| (i) Accuracy (ii) Sensitivity | 4 |
| (iii) Stability (iv) Resolution. | |

UNIT - II

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| 3 a. Write a symbolic representation of thyristors and explain its characteristics. | 10 |
| b. With suitable illustration, discuss the switching arrangement of mechanical switches. | 6 |
| c. Illustrate the working of an electrical relay. | 4 |
| 4 a. With a neat sketch explain the principle of working of a permanent magnet stepper motor. | 10 |
| b. Discuss in brief how MOSFET and Darlington pair can be used to control a dc motor? | 10 |

UNIT - III

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| 5 a. Explain the following terms : | |
| (i) Fetch cycle (ii) State (iii) Bus. | 4 |
| b. With a neat block diagram, explain the concept of microcontroller. | 8 |
| c. State in detail the difference between microprocessor and microcontroller. | 8 |
| 6 a. Explain with a block diagram the architecture of 8085A microprocessor. | 12 |
| b. Discuss about the memory and address related to microprocessor. | 8 |

UNIT - IV

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| 7 a. With suitable illustration, explain NOT, NAND, NOR and X-OR gates. | 10 |
| b. With suitable illustration, explain different types of number system. | 10 |

- 8 a. What is the significance of operational amplifier? How it is used as an inverting amplifier? 10
- b. What is multiplexer? State the basic principle of a two-channel multiplexer. 4
- c. Illustrate a data acquisition system. 6

UNIT - V

- 9 a. Enumerate the types of friction of Guideways. Explain them in brief. 10
- b. Differentiate between the ball screw and roller screw. 5
- c. Enumerate the factors influencing the design of Guideways. 5
- 10 a. With suitable illustration, discuss the concept of methods of preloading of ball-screw nut. 10
- b. With suitable illustration, explain the working of the recirculating ball screw in CNC machine. 5
- c. Explain the concept of phenomenon of stick slip. 5

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