

SIXTH SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY  
MARCH 2013

**INDUSTRIAL AUTOMATION AND MECHATRONICS**

(Common for ME & TD)

[Total Marks: 100]

[Time: 3 Hours]

**PART- A**

(Maximum Marks: 10)

Marks

- I. Answer the following questions in one or two sentences. Each question carries 2 marks.
1. Define Hard Automation.
  2. Define the term 'range' of a transducer.
  3. Define 'accuracy' of a transducer.
  4. Draw the symbol of a 3 port 2 position solenoid valve.
  5. Define PLC.
- (5x 2=10)

**PART - B**

(Maximum Marks: 30)

- II. Answer any five of the following questions. Each question carries 6 marks.

1. Name the various stages in designing mechatronic system.
  2. With the help of a sketch explain the working principle of a Tachogenerator.
  3. Differentiate the static and dynamic characteristics of sensors.
  4. Explain diode characteristic.
  5. Explain the different types of DC Motors.
  6. Discuss the working of Timer.
  7. Explain shift register.
- (5x6=30)

**PART - C**

(Maximum Marks: 60)

(Answer one full question from each unit. Each question carries 15 marks)

**UNIT-I**

- III. a. Explain the advantages and disadvantages of Automation. (7)  
b. Discuss system, measurement system, and control system with examples. (8)

**OR**

- IV. a. Define Mechatronics, Distinguish Traditional and Mechatronic design. (8)  
b. Explain the elements of a measurement system with the help of a sketch. (7)

**UNIT-II**

- V. a. With the help of a sketch explain the working principle of Eddy current proximity sensor. (7)  
b. Discuss the following sensors for fluid pressure measurement. (8)  
(1) Diaphragm (2) Capsule and Bellows.

**OR**

- VI. a. Explain Incremental encoder with the help of a sketch. (8)  
b. Discuss bouncing of mechanical switches. (7)

**UNIT - III**

- VII. a. Describe the basic principle of a D C Motor. (7)  
b. Explain: a) spool valve b. poppet valve. (8)

**OR**

- VIII. a. Describe the basic principle of Stepper motor. (8)  
b. With the help of a sketch explain the working of a solenoid operated spool valve. (7)

**UNIT - IV**

- IX. a. Short note on Ladder diagram. (6)  
b. With the help of a sketch explain the basic internal structure of PLC. (9)

**OR**

- X. a. Explain timed switch in the mechatronic design. (8)  
b. Discuss the common hardware faults. (7)