

19/11/13

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**B.E/B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2013
COMMON FOR MECHANICAL AND MANUFACTURING ENGINEERING BRANCH**

**SEVENTH SEMESTER
ME 9402 - MECHATRONICS
(REGULATIONS 2008)**

Time: 3 hr

Max. Mark: 100

Answer ALL Questions

Part – A (10 x 2 = 20 Marks)

1. Define a mechatronics system.
2. List out the emerging areas of mechatronics.
3. What is the use of phase-sensitive demodulator while using LVDT as transducer?
4. What are the advantages and disadvantages of the plastic film type of potentiometer?
5. What is meant by signal conditioning?
6. What is a freewheeling diode?
7. Differentiate PLC and microprocessor.
8. Devise a cyclic on-off timer by using PLC that will switch an output on for 10s then off for 15s?
9. What are the sensors used in car engine management system?
10. Differentiate the traditional and mechatronics design of the bathroom scale.

Part – B (5 x 16 = 80 Marks)

11. Explain the need and classification of mechatronics. (8+8)
12. a. Describe any four types of proximity sensors.
(OR)
b. Explain RTD, thermistor and thermocouple with temperature curves. (4+4+5)
13. a. Compare the features of various types of stepper motors with diagrams.
(OR)
b. Sketch and explain the working principle of solenoid and MOSFET and also illustrate how MOSFET can be used to control a DC motor. (8+8)
14. a. Devise an interfacing circuit and a logic ladder diagram for a PLC to automate the sequence $A^+B^+B^-A^-$ of an electropneumatic circuit.
(OR)
b. Design a PLC control for a process which is required to direct 10 items along one path for packaging in a box and then 8 items along another path for packaging in another box.
15. a. Describe the mechatronics based pick and place robot with its control diagram.
(OR)
b. Explain the mechatronics design of automatic car barrier with ladder diagram.