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**COMMON TO MECHANICAL AND MANUFACTURING ENGINEERING
VII SEMESTER
ME 472 - MECHATRONICS
(REGULATIONS 2004)**

Time : 3 Hours

Max. Marks : 100

Answer ALL Questions

PART-A (10 x 2 = 20 Marks)

1. Sketch out the elements of mechatronics system.
2. State the advantages of mechatronics system.
3. Distinguish between Active and Passive sensor.
4. Sketch the principle of capacitance sensor.
5. What are the important elements of a measurement system?
6. What are the advantages of servo system over stepper motor?
7. Mention any four applications that are performed using PLCs in automation industry.
8. Illustrate a Ladder diagram with any example.
9. What are the key factors to be considered in designing a mechatronics system?
10. Suggest a design of a mechanical system which can be used to operate a sequence of micro switches in a timed sequence.

PART-B (5 X 16 = 80 Marks)

11. a) i) Discuss the scope and role of mechatronics in industries. (10)
ii) Describe the classification of mechatronics. (6)
12. a) i) Explain the desirable characteristics of sensors. (6)
ii) Describe the construction and the principle of operation of potentiometer. (10)
(OR)
b) Explain the working principle, materials used, advantages and temperature ranges for RTDs and Thermistors.
13. a) i) Compare open loop and closed loop system. (8)
ii) Explain the operation of AC servo motor with a diagram. (8)
(OR)
b) i) What are the various types of electrical actuators? (4)
ii) Compare hydraulic, pneumatic and electrical actuators. (12)
14. a) i) Draw the architecture of PLC and explain the functions of all the blocks. (10)
ii) Explain any three logical functions of PLC with ladder diagram. (6)
(OR)
b) i) Illustrate the role of internal relay, timers and counters in mechatronic system. (12)
ii) What are the factors to be considered in selection of a PLC ?
15. a) Discuss the mechatronics approach solution for the following :
i) Bath room scale (8)
ii) Wiper mechanism (8)
(OR)
b) Explain the design and implementation of mechatronics case study for pick and place robot.