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08IAR24/08MAR24

Second Semester M.Tech. Degree Examination, May/June 2010
Mechatronics System Design

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. Explain the functions of each element in a closed loop control system. **(08 Marks)**

b. Define sequential controller. Explain with a block diagram, the working of a domestic washing machine. **(12 Marks)**

2 a. Explain with block diagram : **(10 Marks)**
   i) Hydraulic power supply
   ii) Pneumatic power supply

b. Discuss the terms commonly used in specifying stepper motor. **(08 Marks)**

c. List the solid state devices which can be used to electronically switch circuits. **(02 Marks)**

3 a. Explain briefly the mechanical system building blocks used in system model representation. **(10 Marks)**

b. Explain the following : **(10 Marks)**
   i) Fluid resistance
   ii) Fluid capacitor
   iii) Thermal capacitance
   iv) Thermal resistance

4 a. Explain the following with necessary sketches: **(10 Marks)**
   i) Micro valve
   ii) Bio-medical sensor.

b. Sketch and explain the working of a micro accelerometer. **(10 Marks)**

5 a. Which is the ideal substrate for MEMS and why? **(06 Marks)**

b. List important applications of polymers for MEMS and micro system. **(06 Marks)**

c. List and explain silicon compounds that are used for MEMS. **(08 Marks)**

6 a. What is ion implantation? Explain the same taking a suitable example. **(08 Marks)**

b. What is photolithography? Explain a general procedure for the same. **(08 Marks)**

c. What is etching process? Explain chemical etching. **(04 Marks)**

7 a. Discuss major fabrication steps used in LIGA process. **(08 Marks)**

b. Explain surface micro machining process, with an example. **(10 Marks)**

c. Discuss bulk micro manufacturing. **(02 Marks)**

8 a. Write a brief note on watch dog timer. **(05 Marks)**

b. Discuss typical faults in a microprocessor system. **(05 Marks)**

c. Discuss the various fault finding techniques that are used in microprocessor based system. **(10 Marks)**

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