CBCS SCHEME

18MT55

Fifth Semester B.E. Degree Examination, Jan./Feb. 2023
Micro and Smart Systems Technology

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a. What is a microsystem? Discuss the need for miniaturization.   **(10 Marks)**
    b. List the classification of integrated microsystems. Explain the operation of ADXL50 accelerometer with neat schematic diagram.   **(10 Marks)**

OR

2   a. Define smart material and explain typical smart system with neat block diagram.   **(10 Marks)**
    b. Discuss the application of smart materials and Microsystems in various fields and explain with application area, smart component and its role of operation.   **(10 Marks)**

Module-2

3   a. Explain the operation of Silicon Capacitor accelerometer with neat diagram and also mention its advantages and applications.   **(10 Marks)**
    b. Explain the operation of electrostatic comb drive with neat diagram as an actuator and sensor.   **(10 Marks)**

OR

4   a. Define a relay. Discuss different types of relays with their features and explain the operation of Magnetic Micro relay with neat diagram.   **(10 Marks)**
    b. Explain the operation of piezoelectric inkjet actuator with neat diagram and mention its applications.   **(10 Marks)**

Module-3

5   a. Explain Chemical Vapor Deposition (CVD) technique with neat diagram and list the parameters that significantly influence the rate of CVD.   **(10 Marks)**
    b. Explain the process of photolithography with neat diagram.   **(10 Marks)**

OR

6   a. Explain with neat diagram the steps involved in the lift-off process of patterning.   **(10 Marks)**
    b. Discuss the applications of polymers and ceramics as specialized materials for Microsystems.   **(10 Marks)**

Module-4

7   a. Explain the operation of normal diode and tunnel diode with junction diagram and VI characteristics.   **(10 Marks)**
    b. Explain the operation of a bipolar junction transistor using basic structure, circuit symbols and output characteristics.   **(10 Marks)**

OR

8   a. Implement Inverter, NAND gate using CMOS logic circuits and outline the operation.

(10 Marks)

    b. Discuss six examples of opamp based circuits with circuit diagram and application.

(10 Marks)

Module-5

9   a. With neat block diagram of a PID controller, explain the design methodology of a PID controller.

(10 Marks)

    b. Write short notes on:
        (i)   Digital controller
        (ii) Micro controller

(10 Marks)

OR

10 a. Discuss performance parameters of pressure sensor relevant to sensitivity, non-linearity with neat characteristic curve.

(10 Marks)

    b. Explain vibration control in a glass Epoxy Composite box beam with neat diagram and experimental results.

(10 Marks)

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