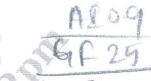
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(10 Marks)

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

- 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)

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- 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.

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

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- 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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