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18MT55

Fifth Semester B.E. Degree Examination, July/August 2022

Micro and Smart System Technology

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define Smart Material and explain Smart Material, with neat block diagram. (10 Marks)
- b. Explain the applications of Smart Materials and Micro System, with a neat sketch. (10 Marks)

OR

- 2 a. List the classification of Integrated Micro System. Explain how ADXL 50 accelerometer works, with a schematic diagram. (10 Marks)
- b. Define Miniaturization. Discuss the need of Miniaturization. (10 Marks)

Module-2

- 3 a. Explain the Operation of Piezo resistive pressure sensor, with neat diagram and mention its advantages and applications. (10 Marks)
- b. Define Electro statics. Explain the operation of Electrostatic comb drive, with a neat diagram. (10 Marks)

OR

- 4 a. With a neat schematic diagram, explain the operation of portable blood analyzer and also mention its advantages and applications. (10 Marks)
- b. Define Relay. Discuss different types of Relay features and explain the Operation of Magnetic Micro relay, with neat diagram. (10 Marks)

Module-3

- 5 a. With a neat diagram, explain the Key process involved in Photolithography. (10 Marks)
- b. Explain the steps in the lift – off process of patterning. Mention the major difference between Lithography and lift – off based patterning. (10 Marks)

OR

- 6 a. With a neat flow diagram, explain the steps involved in Fabrication of Micromachining. (10 Marks)
- b. Explain the process for realizing a Cantilever beam using Surface micromachining technique. (10 Marks)

Module-4

- 7 a. Explain the Operation of Diode and Tunnel Diode, with a neat I – V characteristics. (10 Marks)
- b. With a neat output characteristics, explain n – channel enhancement MOSFET and also list three modes of Operation for MOSFET. (10 Marks)

OR

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- 8 a. Explain the Operation of Bipolar junction transistor with a basic structure, symbol and its output characteristics. (10 Marks)
b. With a standard symbol for an Operational Amplifier, discuss the input – output relation of an ideal Op-amp. (10 Marks)

Module-5

- 9 a. With a neat block diagram, explain the design Methodology of PID controller. (10 Marks)
b. Write a short note on :
i) PZT transducer ii) Vibration in beams
of a Smart structure in Vibration control. (10 Marks)

OR

- 10 a. Explain a Single – Crystal Piezo resistive pressure sensor by showing arrangement of P – type Piezoresistors on an n – type membrane. (10 Marks)
b. Write a short notes on :
i) Digital controller.
ii) Microcontroller.
iii) Programmable Logic Controller. (10 Marks)

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