CBCS SCHEME

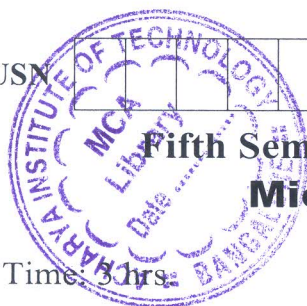USN ☐☐☐☐☐☐☐☐☐☐

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

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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