CBCS SCHEME

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BMT502

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Micro and Smart System Technology

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the concept of miniaturization and its significance with an illustration of objects at various size scales.	10	L2	CO1
	b.	Sketch and explain the integrated MEMS based RF receiver with functions of each component.	10	L2	CO1
		OR			
Q.2	a.	With a neat sketch, explain the building blocks of a typical smart system.	10	L2	CO1
	b.	With a neat schematic, explain the working of ADXL50 Accelerometer.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain the working of Silicon capacitive accelerometer and mention its application.	10	L2	CO2
	b.	Outline the working principle of Piezoelectric inkjet actuator and brief its fabrication process.	10	L2	CO2
		OR			
Q.4	a.	With a neat circuit, explain the principle of operation of piezoresistive pressure sensor and mention the advantages.	10	L3	CO2
	b.	Explain the operation of magnetic micro relay for the switching and draw the circuit for the same.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain the crystal structure of silicon with its Face Centered Cubic Cell combination.	10	L3	CO3
	b.	Illustrate the steps involved in photolithography and sketch the process to represent the same.	10	L3	CO3
		OR			
Q.6	a.	With a neat block diagram, explain the types of thin film deposition in substrate preparation.	10	L3	CO3
	b.	With a neat flow diagram, compare the process of Lithogrpahy and lift-off based patterning.	10	L3	CO3
		Module – 4			
Q.7	a.	Outline the working of following diodes with V-I characteristics and current expressions, (i) Schottky Diode. (ii) Tunnel Diode.	10	L2	CO4
	b.	Explain the three-regions of operation in Bipolar Junction Transistor (BJT) with current and V-I characteristics.	10	L2	CO4

		OR			
Q.8	**a.**	Sketch the circuit and input output characteristics of inverting amplifier and explain the working with output voltage expression.	**10**	**L2**	**CO4**
	b.	Draw the V-I characteristics and circuit of enhancement type in channel MOSFET and explain the regions of operation with current expression.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	With a neat block diagram of PID controller, explain its working with design methodology.	**10**	**L3**	**CO5**
	b.	Demonstrate the role of PZT in vibration of beam with block diagram and experimental results.	**10**	**L3**	**CO5**
		OR			
Q.10	**a.**	Illustrate the performance parameters of a pressure sensor with relevant plots.	**10**	**L3**	**CO5**
	b.	Sketch and explain the electrical connection of piezoresistive pressure sensor. Derive an expression for gauge factor.	**10**	**L3**	**CO5**

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