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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E.

Branch: Electronics and Communication Engineering

Course Code: 19EC3DCMSA

Course: Modern Sensors and its Applications

Semester: III

Duration: 3 hrs.

Max Marks: 100

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.			UNIT - I	CO	PO	Marks
	1	a)	List various tests used to improve the reliability of sensors and explain the purpose of each test.	CO 1	-	10
		b)	Analyze the classification of Type A and Type B uncertainty in relation to sensor characteristics	CO 3	PO2	10
			UNIT - II			
	2	a)	Illustrate the working principle of capacitive water level sensors, explaining how changes in water level affect the capacitance with relevant diagram	CO 2	PO 1	10
		b)	In detail, discuss the physical principle and properties of piezoelectric films. Provide a neat diagram and list the methods of thermal polling used to obtain crystalline materials.	CO 1	-	10
			UNIT - III			
	3	a)	Analyze the working of tactile sensors as a membrane switch, including the underlying principles and components involved, and provide a relevant figure to illustrate the concept.	CO 3	PO 2	10
		b)	Analyze the method of measuring gas pressure using a mercury-filled pressure sensor, discussing the underlying principles, advantages, and limitations of this measurement technique.	CO 3	PO 2	10
			OR			
	4	a)	Analyze the application of a Linear Variable Differential Transformer (LVDT) for measuring displacement, detailing its	CO 3	PO 2	10

			operational principles, construction, and the role of its components with relevant diagrams.			
		b)	Analyze the various methods of sensing force, comparing their principles, applications, and effectiveness in modern sensor technology.	<i>CO 3</i>	<i>PO 2</i>	10
			UNIT - IV			
	5	a)	Analyze the laws governing thermocouples, utilizing diagrams to illustrate their principles	<i>CO 3</i>	<i>PO 2</i>	10
		b)	Analyze RTD (Resistance Temperature Detector) sensors, evaluating the working principle and types used in temperature measurement.	<i>CO 3</i>	<i>PO 2</i>	10
			OR			
	6	a)	Analyze any two computational models employed for NTC (Negative Temperature Coefficient) thermistors, assessing their effectiveness in predicting the resistance-temperature behavior of NTC thermistors.	<i>CO 3</i>	<i>PO 2</i>	10
		b)	Describe the working principle of semiconductor PN junction sensors, analyzing how the PN junction enables the sensor to detect changes in environmental conditions.	<i>CO 3</i>	<i>PO 2</i>	10
			UNIT - V			
	7	a)	Suggest two methods commonly used for the deposition of thin films under high vacuum conditions. Provide neat diagrams to illustrate each method.	<i>CO 1</i>	-	10
		b)	Explain the photolithography process used in the microelectronics industry with relevant diagrams.	<i>CO 1</i>	-	10
