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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.

		UNIT - I	CO	PO	Marks
1	a)	List various tests used to improve the reliability of sensors and explain the purpose of each test.	<i>CO 1</i>	-	10
	b)	Analyze the classification of Type A and Type B uncertainty in relation to sensor characteristics	<i>CO 3</i>	<i>PO2</i>	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	<i>CO 2</i>	<i>PO 1</i>	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.	<i>CO 1</i>	-	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.	<i>CO 3</i>	<i>PO 2</i>	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.	<i>CO 3</i>	<i>PO 2</i>	10
		OR			
4	a)	Analyze the application of a Linear Variable Differential Transformer (LVDT) for measuring displacement, detailing its	<i>CO 3</i>	<i>PO 2</i>	10

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.

		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
