U.S.N.										

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

Autonomous Institute Affiliated to VTU

May 2023 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: MD/ET/EI **Duration: 3 hrs.**
Course Code: 19ES3GCSAM **Max Marks: 100**
Course: Sensors and Measurements **Date: 19.05.2023**

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

1	a)	Define the term Measurement, and discuss its significance with a relevant example.	**04**
	b)	Define and differentiate between the following sets of static characteristics (i) Accuracy and Precision (ii) Threshold and Resolution	**08**
	c)	With an example, explain the generalized functional elements of a measurement system.	**08**

UNIT - II

2	a)	Discuss the physical principle of realizing parallel plate and cylindrical capacitors, and provide an example for the measurement of a physical quantity.	**10**
	b)	Outline how Self-inductance and Mutual –inductance can be used to realize sensors. Give an example Sensor for each of the two principles.	**10**

OR

3	a)	Piezoelectric sensors and passive/direct sensors, and are direction sensitive. Justify this statement with an example of a Quartz (SiO2) crystal's unit cell	**08**
	b)	A resistance strain gauge is mounted on a specimen of Young's modulus = 800 GN/m^2, and is subjected to a tensile force of 500 MN/m^2. Determine the strain created and the new value of the gauge resistance, if the strain gauge has initial R= 120 Ω, and GF = 5.	**06**
	c)	Briefly explain the principle of realizing an Accelerometer, based on a Seismic mass.	**06**

UNIT - III

4	a)	Discuss the measurement of an acoustic signal using a Resistive Microphone, like a Carbon Microphone for example	**06**
	b)	Discuss the construction and working principle of an Optical Hygrometer.	**10**
	c)	Differentiate between the Photoconductive and Photovoltaic modes of light detectors.	**04**

OR

5	a)	Discuss the construction, working principle and characteristics of a Fiber-optic microphone.	**10**
	b)	Explain the basic principle and any one type of Radiation detector.	**06**
	c)	Differentiate between Relative and Absolute Humidity (RH and AH).	**04**

UNIT - IV

6	a)	Compare the principle, materials and characteristics of Resistance Temperature Detectors with Thermistors for temperature measurement.	**10**
	b)	Discuss Heat flow measurement using Pyroelectric principle.	**10**

UNIT - V

7	a)	Discuss the importance of Interface Electronic circuits, highlighting any two interface examples.	**10**
	b)	Explain the various types and sources of Noises in Sensors and Circuits.	**10**

******