Register Number:……..

KUMARAGURU
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B.E. DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Fourth Semester

MECHATRONICS ENGINEERING

U18MCI4202: Sensor and Instrumentation

COURSE OUTCOMES

CO1: Classify the transducers and instruments based on their working principles, characteristics and order of the system.

CO2: Describe the working principle and characteristics of non-electrical transducers (Displacement,Velocity, Temperature, Radiation Pyrometer, Humidity measurement**)**

CO3: Discuss brief about the Non-electrical transducers of another measurements(Force, strain gauge, Vacuum, Light ,Acoustics and Nuclear radiation measurement)

CO4: Discuss about the construction, working principles and characteristics of biomedical sensors.

CO5: Brief the signal conditioning parameters used in measurement system.

CO6: Illustrate the importance of data acquisition system

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

1.	If the markings of a thermometer are improperly calibrated, let's say it's 108°C instead of 100°C, Identify what type of error it is and discuss about the error?	CO1	[K_2]
2.	Define calibration.	CO1	[K_2]
3.	Draw and discuss about helipot and what can be measured using this sensor	CO2	[K_2]
4.	List the types of contact and non contact type temperature sensor.	CO2	[K_2]
5.	Differentiate bonded metal wire gauge and Bonded metal foil gauge.	CO3	[K_2]
6.	Derive the unknown pressure P_1 of Mc cleod Gauge using Boyle's law.	CO3	[K_2]
7.	What are the nature of signals present in human body?	CO4	[K_2]
8.	What happens at the electrode -Electrolyte Interface?	CO4	[K_2]
9.	Differentiate attenuation and Aliasing	CO5	[K_2]
10.	Define sampling and sampling rate	CO6	[K_2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Explain the static and dynamic characteristics of measurement system	12	CO1	[K_2]
	b)	List the types of erors.	4		
12.	a)	Describe in detail about the signal conditioning of RTD	8	CO2	[K_2]
	b)	Discuss about the working principle of smoke detector and its application.	8	CO2	[K_2]
13.		Brief about the sound measurement and types of microphones using for sound measurement.	16	CO3	[K_2]
14.		Differentiate action, resting potential, and half-cell potential. With block diagram explain the ECG recording set up and problems avoided in ECG measurement.	16	CO4	[K_2]
15		Explain in detail about Analog to Digital Conversion and its types with neat sketch.	16	CO5	[K_2]
16.		What is data acquisition? How the data is logged and converted to an actuating signal.	16	CO6	[K_2]

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