U.S.N.										

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

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Medical Electronics Engineering **Duration: 3 hrs.**
Course Code: 22MD3PCBSM **Max Marks: 100**
Course: Biomedical Sensors and Measurements

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)	Explain how measuring instruments are classified based on their application, giving an example for each type.	CO1	PO1	**08**
	b)	If a true value of 100 units is measured as 96 units by an instrument, determine its absolute and relative accuracies.	CO1	PO1	**04**
	c)	Discuss the step response of a First order measuring instrument.	CO1	PO1	**08**
		OR			
2	a)	Discuss the Classification of Instruments based on applications and explain the Performance Characteristics of measuring instruments.	CO2	PO2	**10**
	b)	Elaborate on Units of Measurement Quantities with reference to the Biomedical sensors.	CO2	PO2	**10**
		UNIT - II			
3	a)	With examples, define to differentiate between (i) Mechanical and Electrical Sensors (ii) Active and Passive Sensors	CO1	PO1	**08**
	b)	Discuss the construction and working an LVDT for displacement measurement.	CO1	PO1	**08**
	c)	Two Strain gauges with GF1= 4.0 and GF2 = - 12.5 are subjected to a tensile strain of 10,000 microstrains. If their unstrained resistances are 360 Ω each, determine the changes in the resistances due to the applied strain.	CO3	PO3	**04**
		OR			
4	a)	Mention any one sensor to measure physiological pressure measurement and explain its working principle.	CO2	PO3	**10**
	b)	List the different Biomedical Signals with its Parameters, Typical ranges and Sensor types used to acquire them.	CO2	PO3	**10**

REAPPEAR EXAMS 2024-25

			UNIT - III			
	5	a)	Compare the characteristics of RTDs and Thermistors as Temperature sensors.	*CO2*	*PO2*	**08**
		b)	Discuss the temperature sensitivity of P-N junction diodes and transistors.	*CO2*	*PO2*	**12**
			OR			
	6	a)	Discuss temperature measurement using Thermocouples, and the technique of providing reference junction compensation.	*CO2*	*PO2*	**12**
		b)	Discuss the technique of measuring Core-body temperature using a Radio-pill.	*CO2*	*PO2*	**08**
			UNIT - IV			
	7	a)	Discuss the generation of Action potentials and their propagation in the human body.	*CO3*	*PO3*	**08**
		b)	Compare the characteristic features of Ag-AgCl and Stainless-steel electrodes used as surface electrodes	*CO3*	*PO3*	**12**
			OR			
	8	a)	Explain the Einthoven's triangle and the standard 12-lead clinical ECG system.	*CO3*	*PO3*	**10**
		b)	Discuss EEG electrode placement and signal acquisition using the international 10-20 electrode system.	*CO3*	*PO3*	**10**
			UNIT - V			
	9	a)	Discuss the construction and principle of an Ion-selective FET.	*CO2*	*PO2*	**08**
		b)	Explain the principle of a Zirconia Oxygen sensor.	*CO2*	*PO2*	**08**
		c)	Define a Biosensor with an example application.	*CO2*	*PO2*	**04**
			OR			
	10	a)	Mention the application of CO2 electrode and Zirconia oxygen sensor with its working principle.	*CO3*	*PO3*	**10**
		b)	"Under what conditions Immunosensors, and DNA sensors are preferred". Justify with examples.	*CO3*	*PO3*	**10**

READ BEAR EXAMS 2024-25

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