U.S.N.										

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

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E. **Semester: IV**
Branch: Medical Electronics Engineering **Duration: 3 hrs.**
Course Code: 19ML4PCDIN **Max Marks: 100**
Course: Diagnostic Instruments **Date: 13.09.2023**

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

1	a)	Explain in detail the circuit model of Electrode to electrolyte interface and Skin interface.	**10**
	b)	With a suitable diagram and example describe the concept of resting membrane potential and Action potential.	**10**

OR

2	a)	What are called perfectly polarized and perfectly Non-polarized electrodes? Explain them with suitable equations and examples.	**08**
	b)	With a suitable diagram, list and explain any two types of Micro electrodes.	**12**

UNIT - II

3	a)	How many electrode locations are there in 10-20 electrode system? what are the 4 land marks of the skull that are used for the 10-20 electrode placement. Explain with a neat diagram.	**12**
	b)	What is Einthoven triangle? Explain its significance and related measurements with lead configurations in detail.	**08**

OR

4	a)	Mention the types of electrodes used for biomedical applications out of that explain the electrodes used for EMG recorder.	**10**
	b)	Identify and explain four types of Body Surface Electrodes	**10**

UNIT - III

5	a)	How Isolation Amplifiers are helpful for processing the bio-signal? Explain its working condition with suitable diagrams.	**10**
	b)	What is CMRR of a Differential amplifier? Differentiate between common mode gain and differential mode gain. At what frequency does the CMRR becomes unity?	**10**

UNIT - IV

6	a)	Is Pulse rate and Heart rate are same? What is the difference between them and how do we measure them.	**04**
	b)	Suggest a most suitable measurement for Cardiac output measurement and explain its operating principle, with related equations and methodology.	**08**
	c)	What are the direct and indirect measurement methods of blood pressure? Explain any one method.	**08**

UNIT - V

7	a)	Sketch the arrangement of a P_{CO2} electrode. Explain how it works and what affects the response time of CO_2 electrode and O_2 electrode?	**12**
	b)	Explain the optical principle involved in the measurement of colorimetry and spectrophotometry and summarize its similarities and differences.	**08**

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