Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

Fourth Semester

Biomedical Engineering

BM3491 - Biomedical Instrumentation

Regulations - 2021

Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	List the various types of bioelectric potentials.	L1	1	2
2.	Define Polarizable electrodes.	L1	1	2
3.	Recall the amplitude and frequency of EMG.	L1	2	2
4.	List the brain waves and their frequency.	L1	2	2
5.	Define CMRR in a differential amplifier.	L1	3	2
6.	What are the basic requirements for Bio-amplifier?	L1	3	2
7.	List the various types of blood flow and cardiac output measurement.	L1	4	2
8.	What is blood pressure? How is it measured?	L1	4	2
9.	Recall the normal value of pH, pO2, pCO2 in human blood.	L1	5	2
10.	What is an auto analyzer?	L1	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)*

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a		Classify various types of electrodes used in the medical field. Illustrate the working principle of various surface electrodes using biopotentials measurement.	L2	1	16
			Or			
	b	i	Explain in detail electrodes used to measure the biopotentials within or near a single cell.	L2	1	8
		ii	Summarize the mechanism of generation of action potential and write the necessary equations and mention different stages of action potential.	L2	1	8
12.	a		Interpret the EEG 10/20 electrode system with necessary illustrations.	L2	2	16
			Or			
	b		Explain the bio-amplifier functional blocks with various electrode configuration for Electromyogram application.	L2	2	16

13.	a	Illustrate the working of various isolation amplifiers concepts in terms of transformer coupled and optical with necessary diagrams.	L2	3	16
		Or			
	b	Explain the construction and working principle of Differential amplifier. Mention their importance in biomedical instrumentation.	L2	3	16
14.	a	Explain in detail auscultatory method of arterial blood pressure measurement.	L2	4	16
		Or			
	b	Explain the dye and thermal dilution method and explain the measurement technique for cardiac output using that.	L2	4	16
15.	a	Explain the following biochemical sensors in detail. i. pH ii. pO_2 iii. pCO_2	L2	5	16
		Or			
	b	Illustrate the following: i. Blood Glucose Sensor ii. Blood gas analyzer	L2	5	16