Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026

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.	Define Propagation of biopotential.	L1	1	2
2.	Classify the various types of electrodes.	L1	1	2
3.	Sketch a typical 'pqrst' complex waveform in relation to an ECG.	L1	2	2
4.	Compare and contrast the unipolar and bipolar mode of EMG.	L2	2	2
5.	Point out the necessity for instrument amplifiers in medical equipment.	L2	3	2
6.	Specify the function of the chopper amplifier.	L2	3	2
7.	What are systolic, diastolic and mean pressure? Mention its normal values.	L1	4	2
8.	Write the principle of electromagnetic blood flowmeter.	L2	4	2
9.	Give the normal value of pH, pCO2, and pO2 in human blood.	L1	5	2
10.	Point out the uses of a blood cell counter.	L2	5	2

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

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Summarize the action potential waveform including depolarization, repolarization and absolute and relative refractory periods.	L2	1	10
		ii	Explain the skin electrode interface with a circuit diagram and equations.	L2	1	6
			Or			
	b	i	Define Half cell potential. What are polarizable and non-polarizable electrodes?	L2	1	8
		ii	Explain the various types of depth and needle electrodes used to measure EEG and EMG potentials.	L2	1	8
12.	a		Illustrate the Einthoven's triangle and describe how ECG lead configurations are employed. Explain the different lead configurations for recording ECG Waveform.	L2	2	16
			Or			
	b		Describe with a neat diagram the 10-20 electrode system of EEG and its waveforms.	L2	2	16

13.	a		Why are isolation amplifiers needed in biomedical instrumentation? Explain the construction and working of transformer type and optical isolation amplifiers.	L3	3	16
			Or			
	b	i	Explain how the common mode voltage can be reduced in the right leg driven ECG amplifier with neat circuit diagram.	L3	3	8
		ii	Describe the operation of the Instrumentation amplifier with a neat sketch.	L3	3	8
14.	a	i	Discuss the principle of thermal dilution and the dye dilution method of measurement of cardiac output.	L2	4	16
			Or			
	b	i	Explain the method of blood flow measurement using ultrasonic blood flow meter.	L2	4	10
		ii	State the principle behind measuring blood flow using the transit time method.	L2	4	6
15.	a		Discuss the functions of an Ion selective Field Effect Transistor (ISFET) and immunologically sensitive FET (IMFET) with applications.	L2	5	16
			Or			
	b		Write short notes on a spectrophotometer and an auto analyser.	L2	5	16