

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

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.	Formulate the function of electrode-electrolyte interface used in human tissue.	AN	1	2
2.	Define polarized electrode.	RE	1	2
3.	Draw Einthoven Triangle.	RE	2	2
4.	Generalize the factors influencing EMG signal quality?	UN	2	2
5.	Mention the need for differential bio-amplifier.	RE	3	2
6.	How are ECG waveforms affecting the power line interferences?	AN	3	2
7.	State the principle of respiration rate measurement by CO ₂ method.	RE	4	2
8.	What happens when there is a fall in cardiac output?	UN	4	2
9.	Define IMFET.	RE	5	2
10.	Distinguish between Flame Photometer and spectrophotometer?	UN	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

Q.No	Questions	BLT	CO	Marks
11.	a i Explain the characteristics of bio signals and their propagation.	UN	1	7
	ii Estimate the different properties of Electrode in skin interface.	UN	1	6
	Or			
	b i Explain the difference between unipolar and bipolar electrode configurations?	UN	1	7
12.	ii Classify different types of electrodes.	UN	1	6
	Or			
12.	a Explicate the frequency and amplitude ranges of typical bio signals like ECG and EEG?	UN	2	13
	Or			
13.	b Describe the EEG electrode lead system with unipolar, bipolar and average modes of measurement.	UN	2	13
	Or			
13.	a Express the working principle of isolation amplifiers in detail, give the relation of their types and write of their merits.	AN	3	13
	Or			
13.	b Relate the isolated DC amplifier and AC carrier amplifier used to measured low frequency signal and expiress the operation of low frequency amplifier.	AN	3	13

14.	a	Estimate how the blood pressure measured using direct and indirect method, explain briefly and give defence of both methods.	AN	4	13
		Or			
	b	Summarize the operation of ultrasound blood flow measurement and thermal dilution blood cardiac measurement.	AN	4	13
15.	a i	Demonstrate the working principle of P _{CO} 2, P _O 2 and Ph sensor with necessary illustrations.	AN	5	7
	ii	Elaborate the concept of Blood glucose sensors.	UN	5	6
		Or			
	b i	Analyze the principle of colorimeter, write the Sample concentration of colorimeter and Multi-channel Colorimeter.	AN	5	7
	ii	Elucidate the significance of auto analyzer in the biochemical measurements.	UN	5	6

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>		<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a	With necessary diagrams illustrate how the electrical activity is generated due to contraction of one muscle cell.	AN	2	15
		Or			
	b	Analyze Chopper Amplifier with the help of circuit diagram. Also explain the working principle of each and list the application.	AN	3	15