Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U5B04S

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Fifth Semester

Biomedical Engineering

21UBM504 - BIOMEDICAL INSTRUMENTATION

(Regulations 2021)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	Interpret the term Perfectly Polarized electrode?	CO1-U
2.	Infer the term Perfectly nonpolarizable electrode?	CO1-U
3.	Define latency.	CO1-U
4.	Name the electrodes used for EEG measurement.	CO1-U
5.	Write down any two conditions for design of biomedical pre amplifier.	CO1-U
6.	Examine theneed for band pass filter in bio amplifier circuits?	CO1-U
7.	Discuss the differences between systolic and diastolic blood pressure and their clinical implications.	CO1-U
8.	Mention the significance of Korotkoff sounds.	CO1-U
9.	Name the main components of a typical auto analyzer	CO1-U
10.	Recall the basic principle behind the operation of a biosensor.	CO1-U

PART – B (5 x 16= 80 Marks)

11.	(a)	Define Half-cell potential and analyzethe polarizable and non-polarizable electrodes?	CO1-U	(16)
		Or		
	(b)	Examine the types of surface electrodes that can be used for pick up the bio signals.	CO1-U	(16)

12.	(a)	Explain in detail on phonocardiogram with waveforms. and explain in detail on EOG recordings and interpret the patterns of eye movements displayed during different tasks or activities.	CO1-U	(16)
		Or		
	(b)	Summarize about Electrocardiogram and explain the lead configuration in detail.	CO1-U	(16)
13.	(a)	(i) Design a differential bio-amplifier circuit for amplifying an electroencephalogram (EEG) signal with specific gain and frequency response requirements. Show the frequency response curve for the amplifier against the gain of the amplifier.	CO2-App	(10)
		(ii) Illustrate the requirements to be considered for choosing biomedical amplifiers.	CO1-U	(6)
		Or		
	(b)	(i) Design a chopper amplifier circuit using a mechanical switch and photodiodes to convert low frequency signal into high frequency signal.	CO2-App	(10)
		(ii) Compare and contrast the characteristics of single ended and differential bio-amplifiers.	CO1-U	(6)
14.	(a)	(i) Explain the measurement of blood pressure using sphygmomanometer in detail.	CO1-U	(8)
		(ii) Illustrate the procedure of cardiac output measurement usingthermal dilution technique.	CO1-U	(8)
		Or		
	(b)	(i) Explain the functionality of an instrument that measures respiration rate.	CO1-U	(8)
		(ii) Explain the working principle of electromagnetic blood flowmeter.	CO1-U	(8)
15.	(a)	Elaborate in detail on calorimeter and spectrophotometer.	CO1-U	(16)
		Or		
	(b)	Summarize on PH and pO_2 biochemical sensor system in detail.	CO1-U	(16)