Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2022

Subject Code:3171104 Date:10-01-2023

Subject Name:Biomedical Electronics

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	Describe any three alternative operational modes of Biomedical Instruments.	**03**
	(b)	Discuss the classification of the Biomedical Instruments in brief.	**04**
	(c)	Write the correct names of the vacant blocks of the diagram shown in figure.1. Explain each of these vacant blocks.	**07**
Q.2	**(a)**	Define and Explain Action Potential for Electrically excitable cells.	**03**
	(b)	Operational Amplifier is best to design bioelectric amplifier. Justify	**04**
	(c)	Explain Noise reduction by Feedback and Noise reduction by signal averaging.	**07**
		OR	
	(c)	Explain the types of the Possible Sensor Errors for Biomedical Instruments.	**07**
Q.3	**(a)**	Draw only Network Equivalent Circuit Model of Bio Electrodes.	**03**
	(b)	Discuss the Electrode arrays with diagrams.	**04**
	(c)	Floating electrodes are suitable to reduce motion artifact. Justify	**07**
		OR	
Q.3	**(a)**	Draw and Explain Suction Cup electrodes.	**03**
	(b)	Define Bioelectrodes and Explain Polarizable electrodes.	**04**
	(c)	Differentiate between Needle and Microelectrodes.	**07**
Q.4	**(a)**	Define blood pressure and its types.	**03**
	(b)	Name the ECG standard leads shown in the figure-2. Explain the same in brief.	**04**
	(c)	Draw ECG Waveform and Analyze the same on the basis of the Segments and Intervals for abnormality detection.	**07**
		OR	
Q.4	**(a)**	Explain the Heart Sound in brief with specific diagram.	**03**
	(b)	Draw ECG Read out Device.	**04**
	(c)	Explain the EEG 10-20 Measurements system and its applications.	**07**
Q.5	**(a)**	Define Micro and Macro Shock.	**03**
	(b)	Describe the Physiological Effects of electricity on human body.	**04**
	(c)	Differentiate between CT Scan and X-Ray with appropriate applications of each.	**07**
		OR	
Q.5	**(a)**	Enlist the applications of PET Scan Technology.	**03**
	(b)	Explain the Working Principle of Ultrasonic technology for medical equipment design.	**04**

(c) Explain the power distribution protection for the safety of Patient. **07**

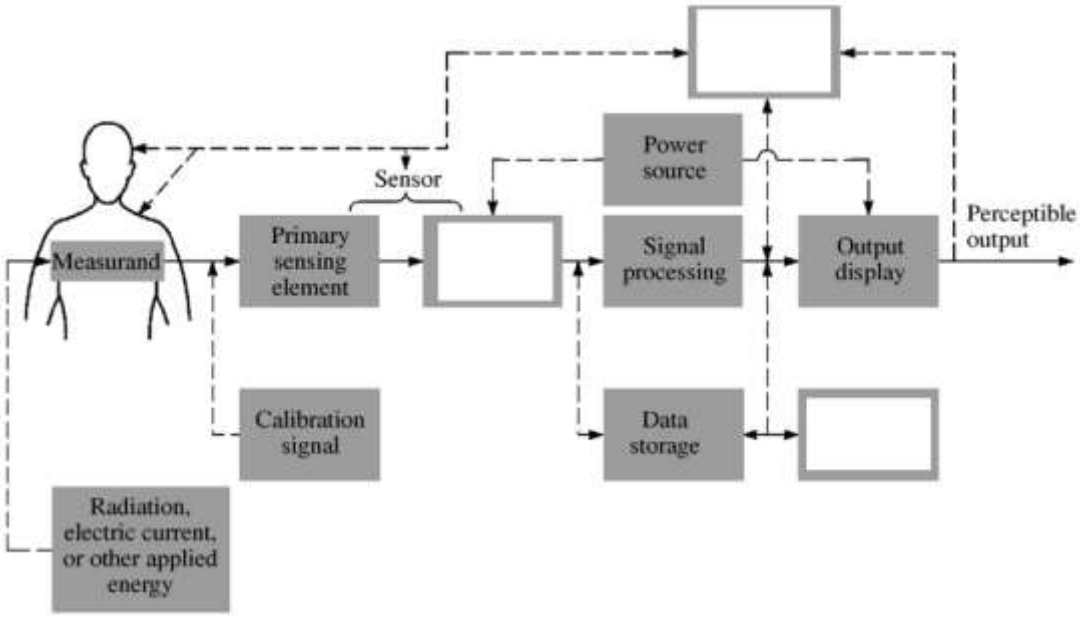

Figure.1

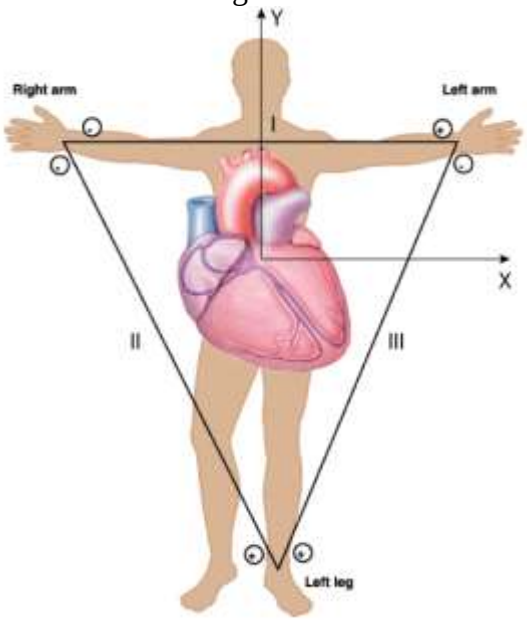

Figure.2