Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2130303 **Date: 31/05/2017**

Subject Name: Bioelectric Potential and Measurement Techniques

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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	Define Biopotentials.	
	2	Give difference between Active and Passive Transducers.	
	3	What is Half-cell potential?	
	4	Give name of different EEG bands with their frequency ranges.	
	5	Define Montage.	
	6	What do you mean by Quantization error?	
	7	What is the reason behind Right Leg Ground in ECG recording?	
	8	Give Examples of Bioacoustic signals.	
	9	What is the difference between Sensors and Transducers?	
	10	Define Cardiac output.	
	11	Give name of any one abnormality in cardiac system and draw relevant ECG waveform.	
	12	What do you mean by sensitivity drift?	
	13	Which form of energy can be converted into electrical energy by piezo transducers?	
	14	What is the importance of linearity of transducers?	
Q.2	**(a)**	Explain the generation action potential with necessary Schematic diagram.	**03**
	(b)	Explain various types of microelectrodes.	**04**
	(c)	Draw and explain various types of surface electrodes.	**07**
		OR	
	(c)	Write a brief note on electrode-skin interface with diagrams.	**07**
Q.3	**(a)**	Explain techniques for measurement of EEG with diagrams.	**03**
	(b)	Explain the theorem for conservation of mass & energy.	**04**
	(c)	Explain the nerve impulse transmission through Spinal cord with necessary diagrams.	**07**
		OR	
Q.3	**(a)**	Explain Biomedical application of any analog transducers.	**03**
	(b)	Explain Biomedical application of any Digital transducers.	**04**
	(c)	Role of Defibrillator. Explain working concepts of it.	**07**
Q.4	**(a)**	In which type of patient's condition, Continuous Monitoring of Bioelectrical Signals is required? Enlist parameters recorded in intensive care monitoring.	**03**
	(b)	State & Interpret the force balance equation for transport processes.	**04**

	(c)	Give types of Pacemaker. Explain working of anyone in details.	**07**
		OR	
Q.4	**(a)**	Define Myoelectric arm. Explain its control mechanism.	**03**
	(b)	Explain the any two types of transducers on the basis of their transduction principal.	**04**
	(c)	Describe the process of propagation of electrical impulse through ion exchange.	**07**
Q.5	**(a)**	Explain Heart rate measurement techniques.	**03**
	(b)	Give name of abnormality associate with Hearing system. How it can be improved with Hearing aids.	**04**
	(c)	List and define static characteristics of bioelectric signal.	**07**
		OR	
Q.5	**(a)**	Write a short note on Functional Electrical Stimulation.	**03**
	(b)	Explain Automated Diagnosis from any Bioelectrical Signals.	**04**
	(c)	List and define dynamic characteristics of bioelectric signal.	**07**

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