Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III(New) • EXAMINATION – WINTER 2016

Subject Code:2130303 Date:02/01/2017

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.**

Q.1		**Short Questions**	**14**
	1	What is the amplitude of normal ECG signal?	
	2	Define action potential.	
	3	Enlist the types of EMG electrodes.	
	4	What is the principle of active transducers?	
	5	Give frequency range of alpha waves of the brain.	
	6	What is the relation between heart rate and cardiac output?	
	7	Which types of batteries are used in cardiac pacemaker?	
	8	State the principle of diathermy.	
	9	What is the amount of energy delivered to the adult patient by defibrillator?	
	10	The amount of muscle action potential is _____.	
	11	What are neurons?	
	12	How many types of leads are there for ECG measurement?	
	13	Define sensitivity of transducer.	
	14	Which transducer is used to measure cardiac output?	
Q.2	**(a)**	What are sources of bioelectric potential?	**03**
	(b)	Write a note on propagation of electric impulse through ion exchange.	**04**
	(c)	Discuss briefly the problems encountered in measuring living system.	**07**
		OR	
	(c)	Explain in detail Kirchoff's laws.	**07**
Q.3	**(a)**	How can we measure the heart rate?	**03**
	(b)	Write down basic principle of transducer and give its classification.	**04**
	(c)	Write a note on transducers for biomedical applications.	**07**
		OR	
Q.3	**(a)**	How can we measure the blood pH?	**03**
	(b)	Explain 'Einthoven Triangle' of ECG measurement.	**04**
	(c)	Draw and explain block diagram of ECG measurement technique.	**07**
Q.4	**(a)**	What are muscles?	**03**
	(b)	How does action potential generate in the muscle?	**04**
	(c)	Describe structure and function of brain in detail.	**07**
		OR	
Q.4	**(a)**	What do you mean by montage in EEG measurement?	**03**
	(b)	Discuss types electrodes used for the measurement of EEG signals.	**04**
	(c)	Explain EMG measurement technique and measurement electrodes.	**07**
Q.5	**(a)**	What is myoelectric arm?	**03**
	(b)	What are elements of Intensive care monitoring?	**04**
	(c)	Write short note on multi-parameter monitoring device.	**07**
		OR	
Q.5	**(a)**	What is basic principle of nerve and muscle stimulators?	**03**

(b) Explain schematic diagram of defibrillator. **04**

(c) Write short note on pacemaker. **07**

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