

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER- III EXAMINATION – SUMMER 2020****Subject Code: 2130303****Date: 27/10/2020****Subject Name: BIOELECTRIC POTENTIAL AND MEASUREMENT TECHNIQUES****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		<b>MARKS</b>
<b>Q.1</b>	(a) Describe briefly the propagation of action potential with neat diagram.	<b>03</b>
	(b) Give the normal frequency range and amplitude range of following Bioelectric signals (1) ECG (2) EMG (3) EEG Also draw ECG waveform with labelling	<b>04</b>
	(c) Explain in detail any three principle of transduction with necessary examples.	<b>07</b>
<b>Q.2</b>	(a) Enlist the various problems encountered during measurement of bio-potentials.	<b>03</b>
	(b) Explain mass and energy conservation theorem briefly.	<b>04</b>
	(c) Define Transducer. Give difference between following: (1) Active Transducer v/s Passive Transducer (2) Analog Transducer v/s Digital Transducer	<b>07</b>
	<b>OR</b>	
	(c) Explain in detail skin – electrode interface with neat labelled diagram.	<b>07</b>
<b>Q.3</b>	(a) Explain structure of Neuron with neat diagram.	<b>03</b>
	(b) Enlist and explain briefly the techniques used for motor movement analysis.	<b>04</b>
	(c) Explain in detail the block diagram of EEG measuring system.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Define Electrode. Classify the various types of electrodes giving examples.	<b>03</b>
	(b) Explain Cardiac Cycle events in brief with diagram.	<b>04</b>
	(c) Define Montage and illustrate 10 – 20 electrode system for measurement of EEG.	<b>07</b>
<b>Q.4</b>	(a) Explain briefly the basic working of defibrillator with diagram.	<b>03</b>
	(b) Describe briefly any one method for measurement of Cardiac output.	<b>04</b>
	(c) Describe in detail the instrumentation system for measurement of EMG with neat diagram.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Define Diathermy. Explain briefly application of diathermy in therapy	<b>03</b>
	(b) Explain structure of Muscle with neat labelled diagram	<b>04</b>
	(c) Explain measurement of ECG using Einthoven's triangle technique with neat diagram.	<b>07</b>

- Q.5 (a) Explain briefly the need of measuring Bioelectric signals continuously. **03**  
(b) Compare and contrast Nerve Stimulator and Muscle Stimulator **04**  
(c) Explain in detail Multipara monitoring system with diagram. **07**
- OR**
- Q.5 (a) Write short note on Functional Electrical Stimulus. **03**  
(b) Explain the block diagram of Hearing Aid system. **04**  
(c) Explain briefly the technique of automatic diagnosis for any two bioelectric signal. **07**

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