

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2018****Subject Code:2161712****Date:04/12/2018****Subject Name:Bio-Potential Instrumentation****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.

		MARKS
<b>Q.1</b>	(a) List out various types of physiological signals with their amplitude and frequency ranges.	<b>03</b>
	(b) Briefly explain action potential and resting potential.	<b>04</b>
	(c) Draw and explain generalized medical instrumentation system.	<b>07</b>
<b>Q.2</b>	(a) Explain various types of measurement errors.	<b>03</b>
	(b) Which are the types of noises? Explain SNR.	<b>04</b>
	(c) With suitable diagram explain Instrumentation amplified for amplifying weak biological signals.	<b>07</b>
<b>OR</b>		
	(c) What is importance of “isolation” in medical instruments? With proper diagram explain “isolation amplifier” in detail.	<b>07</b>
<b>Q.3</b>	(a) What do you mean by electrode skin interface?	<b>03</b>
	(b) Explain Electro Conduction system of heart with diagram.	<b>04</b>
	(c) Draw and explain ECG machine in detail.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) Explain various types of ECG electrodes.	<b>03</b>
	(b) Briefly explain cerebral angiography.	<b>04</b>
	(c) Draw and explain 10-20 electrode system for EEG measurement.	<b>07</b>
<b>Q.4</b>	(a) What is EEG? How it is generated?	<b>03</b>
	(b) Explain the structure and function of central nervous system.	<b>04</b>
	(c) With suitable diagram explain EEG machine.	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) What is EEG telemetry? Briefly explain it.	<b>03</b>
	(b) Explain the classification of EEG signals as per frequency ranges.	<b>04</b>
	(c) Explain pre amplifiers for EEG system and also discuss EEG system specifications.	<b>07</b>
<b>Q.5</b>	(a) Explain physiological effects of electricity.	<b>03</b>
	(b) What is micro shock hazard? Explain it.	<b>04</b>
	(c) Explain electrical safety codes and standards.	<b>07</b>
<b>OR</b>		
<b>Q.5</b>	(a) Explain standard lead system for ECG.	<b>03</b>
	(b) What is macro shock hazard? Explain it.	<b>04</b>
	(c) Explain ECG faults and troubleshooting in detail.	<b>07</b>

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