Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII(NEW) • EXAMINATION – WINTER 2016

Subject Code:2171102 **Date:01/12/2016**

Subject Name:Biomedical Instrumention(Departmental Elective - II)

Time:10.30 AM to 1.00 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	**(a)**	Enlist and describe the basic objectives of a generalized instrumentation system. Briefly explain the physiological systems of human body.	**07**
	(b)	With the help of neat figures, explain *resting state* and *active state* of a cell. What is an *action potential?*	**07**
Q.2	**(a)**	What is a *bioelectric potential*? Describe, in brief, various bioelectric potentials available in human body stating their importance.	**07**
	(b)	What is a *biopotential electrode*? Draw and explain the equivalent circuit of electrode-electrolyte interface. Briefly explain the measurement of biopotentials with two electrodes.	**07**
		OR	
	(b)	Classify the types of biopotentials electrodes. With neat figures, describe the working of *needle electrodes* and *microelectrodes.*	**07**
Q.3	**(a)**	Explain the terms: *noise factor* and *noise figure.* Enlist the types of noise and noise reduction strategies.	**07**
	(b)	With the help of neat figures, explain 12 lead ECG recording system. What is *Einthoven's triangle?*	**07**
		OR	
Q.3	**(a)**	Describe the types of sensors and tactics/ signal processing methods for improved sensing.	**07**
	(b)	Draw a typical ECG waveform stating amplitudes and time durations of all waves. Describe the physiology and significance associated with P wave, QRS complex and T wave.	**07**
Q.4	**(a)**	Write a note on sources of noise in ECG. Explain ECG amplification and signal conditioning circuits with neat figures.	**07**

	(b)	Explain the following terms: *Cerebral angiography, cranial x-rays, brain scans.*	**07**

OR

Q.4	**(a)**	Explain the 10-20 EEG recording system. With neat figures, explain typical EEG rhythms.	**07**
	(b)	Draw and explain the EEG system block diagram with an emphasis on preamplifiers and system specifications.	**07**
Q.5	**(a)**	Write a note on visual and auditory evoked potential recordings. Briefly explain the sleep patterns and the diagnostic uses of EEG.	**07**
	(b)	Write a comprehensive note on Electrical safety codes and standards.	**07**

OR

Q.5	**(a)**	Describe *EEG telemetry* and typical EEG system *artifacts* and *faults.*	**07**
	(b)	Write a note on basic approaches to protection against shock and equipment protection.	**07**

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