Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – WINTER 2015

Subject Code: 171006 **Date: 04/12/2015**

Subject Name: Biomedical Instrumentation

Time: 10:30am to 1:00pm **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)**	State and describe the components of a Man-instrument system.	**07**
	(b)	Define the terms: *Action Potential*, *Resting Potential*. State and explain different types of biopotentials available in human body.	**07**
Q.2	**(a)**	What is the difference between *electrodes* and *transducers*? Explain different transducers used for biomedical applications.	**07**
	(b)	Draw the diagram that relates *blood pressure* variations with *heart sounds* and ECG waveform. Explain, in brief, *indirect* method of blood pressure measurement.	**07**
		OR	
	(b)	Explain the methods used for *heart rate*, *pulse rate* and *respiration rate* measurement.	**07**
Q.3	**(a)**	Draw the block diagram of an *electrocardiograph* (ECG) machine and explain different blocks in detail.	**07**
	(b)	What is the necessity of *pacemaker* and *defibrillator*? Explain the working principles of these instruments.	**07**
		OR	
Q.3	**(a)**	Explain *electroencephalograph (EEG)* and *electromyograph* (EMG) machines with their block diagrams and discuss their applications.	**07**
	(b)	Explain *Heart Lung Machine* and *Diathermy unit for surgery/therapy.*	**07**
Q.4	**(a)**	What is the *cardiac output*? Explain *any two* methods of *blood flow* measurement.	**07**
	(b)	Explain the *echocardiography* and *colour Doppler* measurement techniques.	**07**
		OR	

Q.4	**(a)**	Explain the principle of radiation. Draw and explain the block diagram of an *x-ray machine*.	**07**
	(b)	Explain the operating principle of Ultrasound imaging.	**07**
Q.5	**(a)**	Explain the working principle of *computed tomography (CT)* and *magnetic resonance imaging (MRI)*.	**07**
	(b)	What is *biotelemetry*? Explain its application in patient care and monitoring.	**07**

OR

Q.5	**(a)**	State and explain the equipments in intensive care unit (ICU). Explain the role of LASER in surgery.	**07**
	(b)	Explain the significance of Electrical hazards and Patient safety in biomedical equipments.	**07**

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