Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII(NEW) EXAMINATION – SUMMER 2019

Subject Code:2170310 Date:16/05/2019

Subject Name:Introduction to Virtual Biomedical 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
Q.1	**(a)**	Explain Advantages of Virtual Instrument.	**03**
	(b)	Explain the use of Hardware and Software in Virtual Instrumentation.	**04**
	(c)	Give Difference: Virtual vs. Traditional Instrument	**07**
Q.2	**(a)**	Compare: Graphical and Textual Programming	**03**
	(b)	What is the requirement of analog signal conditioning? Classify various analog signal conditioning techniques.	**04**
	(c)	Draw and Explain the Architecture of Virtual Instrument.	**07**
		OR	
	(c)	Discuss the merits and demerits of distributed virtual instrument.	**07**
Q.3	**(a)**	Explain the characteristics of D-to-A converter.	**03**
	(b)	Enlist and explain various types of A-to-D converters.	**04**
	(c)	Explain the process of analog to digital conversion in detail.	**07**
		OR	
Q.3	**(a)**	Explain the effect of quantization and quantization error in detail.	**03**
	(b)	Classify types of noises based on various sources.	**04**
	(c)	Design Heart Rate variability analysis instrument in Lab VIEW.	**07**
Q.4	**(a)**	Give difference between analog and digital filtering.	**03**
	(b)	Give characteristics of FIR filters.	**04**
	(c)	Design Air Flow and Lung Volume measurement instrument in Lab VIEW.	**07**
		OR	
Q.4	**(a)**	Draw and explain the block diagram of conventional ECG machine.	**03**
	(b)	Enlist and explain the techniques for QRS detection.	**04**
	(c)	Design Noninvasive Blood Pressure Measurement Instrument in Lab VIEW.	**07**
Q.5	**(a)**	Enlist and explain various types of EMG electrodes.	**03**
	(b)	Explain the time and frequency domain characteristics of EMG signal.	**04**
	(c)	a) What is functional integration? Discuss various types of approaches for functional integration. b) Define signal compression. Explain the analog circuit used for signal compression.	**07**
		OR	
Q.5	**(a)**	Explain Virtual Prototyping.	**03**
	(b)	Explain generation and propagation of action potential.	**04**
	(c)	Explain various applications of VBI in the field of Virtual Reality & 3D graphical modeling.	**07**

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