GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER–VII EXAMINATION – WINTER 2025

Subject Code:3170318   **Date:28-11-2025**

Subject Name:Virtual Instrumentation

Time:10:30 AM TO 01:00 PM   **Total Marks:70**

Instructions:
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

			MARKS
Q.1	**(a)**	Define Virtual Instrumentation. List out the Advantages of Virtual Instrument.	**03**
	(b)	Define distributed virtual instrument system with necessary diagrams.	**04**
	(c)	Draw and explain the architecture of Virtual Instrument.	**07**
Q.2	**(a)**	What sets apart Virtual Instruments from Traditional Instruments?	**03**
	(b)	Compare graphical and textual programming methods.	**04**
	(c)	List and elucidate different types of structures offered in LabVIEW along with their relevant applications.	**07**
		OR	
	(c)	What are the different types of case structures and sequence structures?	**07**
Q.3	**(a)**	Define the VI and sub-VI structure. List out the advantages of using sub-VIs.	**03**
	(b)	What is RS232? What are the advantages and disadvantages of using RS232?	**04**
	(c)	Enlist various types of A-to-D converters. Explain any one in detail.	**07**
		OR	
Q.3	**(a)**	Give characteristics of IIR filters.	**03**
	(b)	Compare analog and digital filters.	**04**
	(c)	Define string I/O and file I/O. What are the different types of string I/O and file I/O? How do you use string I/O and file I/O to read and write data?	**07**
Q.4	**(a)**	List and explain the different types of analysis tools available in NI LabVIEW.	**03**
	(b)	What is a power spectrum? How can power spectra be used to analyze signals?	**04**
	(c)	Explain the structure of for loop and while loop.	**07**
		OR	
Q.4	**(a)**	What are the basic operations of linear algebra?	**03**
	(b)	Describe the criteria for choosing the right analysis tool for a particular task with appropriate example.	**04**
	(c)	What is a wavelet transform? How can wavelet transforms be used to analyze signals?	**07**

Q.5 **(a)** What are the challenges in applying motion control techniques to biomedical systems? **03**

(b) List various types of noises and artifacts influencing EMG signal measurement. **04**

(c) Draw and explain the block diagram of virtual ECG machine. **07**

OR

Q.5 **(a)** Enlist and define the features of ECG signal. **03**

(b) Enlist various challenges associated with the application of virtual reality in biomedical signal acquisition and analysis. **04**

(c) Detail the benefits of employing virtual instrumentation for image acquisition and processing in contrast to conventional techniques. **07**

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