Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014

Subject code: 1723101 **Date: 16-06-2014**

Subject Name: Virtual Biomedical Instrumentation System

Time: 02:30 pm - 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.**

Q.1	**(a)**	Explain architecture of virtual biomedical instrumentation.	**07**
	(b)	Explain the merits and demerits of virtual instrumentation over conventional instrumentation.	**07**
Q.2	**(a)**	Explain the different tools and platforms used for biomedical virtual instrumentation systems.	**07**
	(b)	Write the frequency ranges of below given biological signals and select sampling frequency, number of acquisition channels, input buffer size and device voltage ranges for each signal acquisition system accordingly. 1. Electroneurogram (ENG) 2. Pulseplethysmogram (PPG) 3. Electrogastrogram (EGG)	**07**
		OR	
	(b)	What do you mean by FFT analysis of any signal? A biomedical signal acquisition system is acquiring 10000 samples of 10sec signal in MATLAB. Which information is needed to do FFT analysis of this 1D array of 10000 samples? Justify your answer with mathematical formula.	**07**
Q.3	**(a)**	Explain any two types of ADC and also give the comparison between them.	**07**
	(b)	Which parameters should be considered while acquiring two analog waveforms having various frequency components ranges from 5 Hz to 50 kHz?	**07**
		OR	
Q.3	**(a)**	Explain the characteristics of ADC with suitable example.	**07**
	(b)	Draw and explain the block diagram for EOG signal acquisition system.	**07**
Q.4	**(a)**	Draw and explain the block diagram for ECG signal acquisition and classification for diagnosis of cardiac disorders.	**07**
	(b)	Explain protocols of parallel port digital data communication.	**07**
		OR	
Q.4	**(a)**	Draw and explain the block diagram for virtual EMG signal acquisition system.	**07**
	(b)	Explain protocols of serial port digital data communication.	**07**
Q.5	**(a)**	Draw and explain the block diagram for PCG signal acquisition and classification for heart rate variability.	**07**
	(b)	Explain the use of circular buffer in any biomedical signal acquisition system.	**07**
		OR	
Q.5	**(a)**	Write a short note on moving average filter.	**07**
	(b)	Give the difference between Digital and analog filters.	**07**

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