

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – WINTER • 2013****Subject code: 1723101****Date: 24-12-2013****Subject Name: Virtual Biomedical Instrumentation System****Time: 10.30 am – 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.

- Q.1** (a) Draw and Explain PC based multiple signal acquisition system. **07**
(b) Explain the applications of virtual instrumentation in biomedical engineering with examples. **07**
- Q.2** (a) Draw and explain the block diagram for Ballistocardiogram (BCG) signal acquisition system. **07**
(b) Explain the categories of analog signal. Discuss the effects of resolution on ADC precision **07**
- OR**
- (b) What is signal limit setting? Calculate measurement precision of 12 bit A/D converter for various device voltage ranges and limit setting. **07**
- Q.3** (a) Explain the concept of adaptive filtering. What is system identification and noise cancelation? **07**
(b) Draw and explain the block diagram for PCG signal acquisition and classification for heart rate variability. **07**
- OR**
- Q.3** (a) Draw and explain the block diagram for ECG signal acquisition and classification for diagnosis of cardiac disorders. **07**
(b) Explain Virtual spirometer in detail. **07**
- Q.4** (a) Explain with block diagram, conventional Virtual EEG machine. **07**
(b) Explain parallel port communication for Virtual Biomedical Instrumentation System. **07**
- OR**
- Q.4** (a) A biomedical signal acquisition system is acquiring 3000 samples of 10sec signal in LabVIEW. Which information is needed to do FFT analysis of this 1D array of 3000 samples? Justify your answer with mathematical formula. **07**
(b) Explain serial port communication for Virtual Biomedical Instrumentation System. **07**
- Q.5** (a) Write a short note on Huffman encoding for data compression. **07**
(b) Explain the advantages and disadvantages between conventional and virtual system. **07**
- OR**
- Q.5** (a) Write a short note on run length encoding for data compression. **07**
(b) Explain analog and digital triggering. Give one example of both type of triggering. **07**
