

**End Term Examination (December 2018)**

**School:** School of Engineering

**Program:** B.Tech (Biomedical Engg.)

**Course:** Biomedical Signal Processing

**Course code:** BME304

**Semester:** V

**Max Marks:** 40

**Duration (mins) :** 120

**Answer any FOUR questions.**

**Figures to the right indicates full marks**

- Q1.** (a) Explain the following biomedical signals. Draw the waveform and give the frequency ranges relevant to this signal. **[6]**  
(i) ECG (ii) EEG
- (b) Explain the difficulties encountered in biomedical signal analysis and acquisition. **[4]**
- Q2.** What are the advantages of an adaptive filter? Design an adaptive filter using LMS algorithm **[10]**
- Q3.** Given a sequence of 28 data points  $\{1,1,1,1,1,1,1,1,2,2,2,2,2,2,3,3,3,3,3,4,4,4,4,5,5,5,6,6,7\}$  Illustrate Huffman coding. **[10]**
- Q4.** Explain QRS detection algorithm. **[10]**
- Q5.** If  $x(n) = \{-1,-4,3,3,0,0,0,0\}$ ; Find out 8 point DIT-FFT of  $x(n)$ . **[10]**
- Q6.** (a) What is correlation in signal processing? **[5]**  
Find out the autocorrelation factor of  $x(n) = \{4,5,6,7\}$
- (b) Determine the IDFT of  $X(k) = \{3,(2+j),1,(2-j)\}$  **[5]**