Printed Pages: 01 **Sub Code:EIC032**

Paper Id: **131246** **Roll No.** | | | | | | | | | | |

B.TECH

(SEM. VIII) THEORY EXAMINATION 2018-19

BIO-MEDICAL SIGNAL PROCESSING

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

a. Give any four examples of bioelectrical signal.
b. What is the clinical importance of EMG signals?
c. Draw the PQRST curve of an ECG and label it.
d. How we measure amplitude in ECG define.
e. What is the use of FAN algorithm?
f. Write short note on turning point algorithm.
g. What is the frequency range of beta wave in EEG? What is its significance?
h. Describe briefly the sleep EEG.
i. Mention any two advantages of Adaptive Noise Canceller.
j. What is overlapping wavelets?

SECTION B

2. Attempt any *three* of the following: **10x3=30**

a. With the help of a block diagram, explain the objectives of biomedical signal analysis.
b. Explain about portable Arrhythmia monitor with a neat sketch.
c. Classify the different data reduction techniques. Explain the turning point algorithm used for the ECG data reduction.
d. What is the clinical importance of EEG? Mention the different conditions where beta and alpha waves are generated.
e. What are the advantages of an adaptive filter? Design an adaptive filter using LMS algorithm.

SECTION C

3. Attempt any *one* part of the following: **10X1=10**

a. Explain three difficulties encountered in biomedical signal analysis and acquisition.
b. Explain the following biomedical signals. Draw the waveform and give the frequency ranges relevant to these signals: i). ECG, ii). EEG.

4. Attempt any *one* part of the following: **10X1=10**

a. Discuss about two types of electrodes used in ECG.
b. Explain the QRS detection algorithm in detail.

5. Attempt any *one* part of the following: **10X1=10**

a. Draw the flow chart for AZTEC algorithm.
b. Explain the Huffman coding and its uses for ECG data compression.

6. Attempt any *one* part of the following: **10X1=10**

a. Discuss Maximum Likelihood Method for EEG analysis. Differentiate it w.r.t ARMA method.
b. With suitable figures describe the AR modeling of seizure EEG. Explain the steps involved in sleep stage analysis.

7. Attempt any *one* part of the following: **10X1=10**

a. Discuss in detail about different applications of adaptive filters.
b. What is adaptive wavelet detection method? Specify two critical parameters which determine the stability of LMS algorithm?