B.TECH SEM – V (2007 COURSE) (BIOMEDICAL ENGG.) : SUMMER - 2018

SUBJECT: BIOMEDICAL DIGITAL SIGNAL PROCESSING

Day: **Friday** Time: **10.00 AM TO 01.00 PM**

Date: **25/05/2018** **S-2018-2693** Max. Marks: 80

N.B.:

1) **Q. No. 1** and **Q. No. 5** are **COMPULSORY**. Out of remaining attempt **ANY TWO** questions from each section
2) Figures to the right indicate **FULL** marks.
3) Answer to both the section should be written in **SEPARATE** answer book.
4) Draw neat and labeled diagram **WHEREVER** necessary.
5) Assume suitable data, if necessary.

SECTION-I

Q.1 **a)** State and explain Sampling theorem. **(05)**

b) What is the function of smoothing filter? **(05)**

c) Define and explain continuous wavelet transform. **(04)**

Q.2 **a)** With a neat schematic explain the operation of Successive approximation Analog to digital converter. **(07)**

b) What is aliasing effect? How to overcome it? **(06)**

Q.3 **a)** Explain selection method for 'r' and 'θ' in designing two pole IIR filter. **(07)**

b) List and explain the advantages of Adaptive filters? **(06)**

Q.4 **a)** Explain in detail data reduction technique of amplitude zone time epoch coding algorithm. **(07)**

b) With a suitable example describe static Huffman coding . **(06)**

SECTION – II

Q.5 **a)** Define DFT. Explain any two properties of DFT. **(05)**

b) Explain template matching techniques. **(05)**

c) What is ST segment analyzer? **(04)**

Q.6 **a)** Draw the flow graph for the implementation of 8 – point DIT - FFT for given sequence x(n) = {0, 1, 2, 3, 4, 5,6, 7}. **(07)**

b) Obtain the autocorrelation for the following sequence **(06)**
x(n) = {1, 3, 5, 7}

Q.7 **a)** How to detect QRS complex in an ECG signal using band-pass filtering technique? **(07)**

b) What is the use of squaring function and moving window integrator in QRS detection algorithm? **(06)**

Q.8 **a)** Draw and explain portable arrhythmia monitor. **(07)**

b) Explain the interpretation of the 12 – lead ECG. **(06)**

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