

B.TECH. SEM -V BIO MEDICAL 2014 COURSE (CBCS) :
SUMMER - 2018
SUBJECT: BIOMEDICAL DIGITAL SIGNAL PROCESSING

Day: Thursday
Date: 24/05/2018

S-2018-2378

Time: 10.00 AM TO 01.00 PM
Max. Marks: 60

N.B:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data, if necessary.
- 4) Use of non programmable **CALCULATOR** is allowed.

Q.1 With a neat block diagram, explain the operation of flash analog to digital converter. **(10)**

OR

- Q.1** a) State sampling theorem. What is aliasing effect? How to overcome it? **(06)**
b) What are the conversion requirements for biomedical signals? **(04)**

Q.2 What are the steps to design FIR filter using window method? **(10)**

OR

- Q.2** a) Compare FIR and IIR filters. **(06)**
b) What are the main advantages of adaptive filters over FIR and IIR filters? **(04)**

Q.3 Find the Huffman code for the following set of data points. **(10)**
{1,1,1,1,1,1,1,1,2,2,2,2,2,2,3,3,3,3,3,3,4,4,4,4,5,5,5,6,6,7}

OR

- Q.3** a) How do you reduce data using turning point algorithm. **(06)**
b) Describe the advantages and disadvantages of modified Huffman coding. **(04)**

Q.4 Draw the flow graph for the implementation of 8 point DIT-FFT of the following sequence: **(10)**
 $x(n) = \{1,1,1,1,0,0,0,0\}$

OR

- Q.4** a) Convolve the following two sequences **(06)**
 $x(n) = \{1,1,1,1\}$
 $h(n) = \{2,2\}$
b) Explain any two properties of DFT. **(04)**

Q.5 Detect QRS complex in an ECG signal using band pass filtering technique? Explain. **(10)**

OR

- Q.5** a) Explain the real time QRS detection algorithm with block diagram. **(06)**
b) What is importance of QRS complex detection in an ECG signal? **(04)**

Q.6 What is Arrhythmia analysis algorithm based on mapping the RR interval and QRS duration into two dimensional space. **(10)**

OR

- Q.6** a) Describe the steps involved in interpreting the 12-lead ECG. **(06)**
b) What is ST segment analyzer? **(04)**