Printed Pages: 01 **Sub Code: MTEC201**

Paper Id: 231210 **Roll No.** | | | | | | | | | | |

M TECH
(SEM II) THEORY EXAMINATION 2018-19
DISCRETE TIME SIGNAL PROCESSING

Time: 3 Hours ***Total Marks: 70***

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

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a. What is sampling rate conversion explain in brief.
b. Write the equations of complex multiplication and complex addition in FFT algorithm.
c. Write different functional mode of commercial DSP processors.
d. Explain in brief one method of analog to digital conversion.
e. What do you understand by interpolation by factor of I?
f. How many type of error created in QMF bank name them?
g. What is symmetry propriety of discrete Fourier transform?

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a. For the given two sequence of length 4 as under
x(n)= {1,2,3,4} and y(n)= {1,2,2,1}
Compute the circular convolution.
b. Explain alias-free QMF system with proper equations and diagrams.
c. How the reconstructions of the signals takes explain in detail.
d. Explain the sampling rate conversion of band pass signals and also explain the rate conversion by an arbitrary factor.
e. What is two channel para-unitary lattices explain in detail.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a) Why we need digital signal processing and how it is differ from analog signal processing.
(b) Explain different digital to analog conversion techniques.

4. Attempt any *one* part of the following: 7 x 1 = 7

(a) A sequence x (n) is upsampled by I = 2, it passes through an LTI system and then it is downsampled by D = 2. Can we replace this process with a single LTI system? If yes determine the system function.
(b) Explain in detail one application of multirate signal processing.

5. Attempt any *one* part of the following: 7 x 1 = 7

(a) Explain the design procedure of power symmetric filters.
(b) Explain M- channel filter bank in detail.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a) Let x(n) be a finite duration sequence of length 8 such that
X(n)= {-1,0,2,0,-4,0,2,0}
Find X(k) using DITFFT flow graph.
(b) State and proof time reversal property of a sequence.

7. Attempt any *one* part of the following: 7 x 1 = 7

(a) Explain different addressing formats of DS processors.
(b) Give the architecture and advance features of commercial DS processors.