PAPER ID-421746

Subject Code: MTEC201

Roll No: | | | | | | | | | | | | | |

MTECH
(SEM II) THEORY EXAMINATION 2021-22
DISCRETE TIME SIGNAL PROCESSING

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

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

SECTION A

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

a.	Write down the advantages of digital over analog signal processing.
b.	Define the term: Sampling & Quantization.
c.	Explain about the sampling rate conversion process.
d.	Define the term: Decimation & Interpolation.
e.	Explain about the Amplitude & Phase Distortions.
f.	Write down the Symmetric Property of DFT.
g.	Write down the need for the Digital Signal Processor.

SECTION B

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

a.	Derive the sampling method for impulse train sampling.
b.	Write down the steps for sampling rate conversion by a factor I/D.
c.	Write a short note on 2-Channel Quadrature Mirror Filter Banks with neat and clean diagram.
d.	Compute the DFT of the sequence $x(n)=cos(n\pi/2)$ where N=4 using DIF FFT algorithm.
e.	Illustrate the conditions used to select a Digital Signal processor.

SECTION C

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

a.	Draw the block diagram of digital signal processing system.
b.	Illustrate the types of ADC and DAC used in digital signal processing system.

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

a.	Summarize the need for scaling and derive the scaling factor for a second order IIR filter.
b.	Illustrate in detail about the process of interpolation by a factor I.

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

a.	Write a short note on M-channel FIR Para-unitary QMF banks.
b.	Write a short note on lattice structures for linear phase FIR PR QMF banks.

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

a.	Evaluate the 8-point for the given sequence using DIT FFT algorithm. $x(n) = \begin{cases} 1 & for \quad -3 \le n \le 3 \\ 0 & otherwise \end{cases}$
b.	Write down the Linearity & Periodicity Properties of DFT.

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

a.	Elaborate the difference between Von Neumann architecture & Harvard architecture.
b.	List out the different instructions set of Digital Signal processor.