

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

M.Tech S1 (R,S) Exam Dec 2020

Cluster: **Kollam**Specialisation: **Communication Systems****02EC6221 ADVANCED DIGITAL SIGNAL PROCESSING**

Time: 3 Hrs

Max. Marks: 60

Instructions: *Answer All Questions from Part A.*
Answer Two Full questions from Part B.

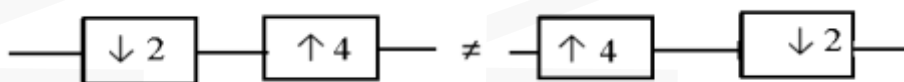
PART A

1. Describe the sampling locations in the case of rectangular geometry in $t_1 - t_2$ plane.
 Obtain the equations that forms the basis of 2D sampling theorem

2. Obtain the 2-D convolution of the following input sequence and its kernel.

				m	-1	0	1	
			n					
7	7	7	-1	2	-3	-1		
3	5	6	0	0	0	0		
5	2	4	1	1	4	1		
INPUT			KERNEL					

3. Explain with relevant figures how the window of wavelets is adaptive to frequency variations. State the advantage of wavelets over STFT.
4. Prove that the interchange of the cascades of the below shown downsampler and the upsampler are not equal.



(4 x 9=36)

PART B

5. Derive LMS algorithm and describe its advantages over other adaptive algorithms
6. Design an ideal band pass filter with a frequency response

$$H_d(e^{j\omega}) = \begin{cases} 1 & \pi/4 \leq |\omega| \leq 3\pi/4 \\ 0 & \text{otherwise} \end{cases}$$

Find the values of $h(n)$ for $N=11$. Find $H(z)$. Plot the frequency response

7. Explain about Lth band filters. With a neat sketch explain the impulse response of a typical third band filter.

(2 x 12=24)