



ADAMAS UNIVERSITY
END-SEMESTER EXAMINATION: MAY 2021
(Academic Session: 2020 – 21)

Name of the Program:	B.Tech.	Semester:	VIII
Paper Title:	Advanced Digital Signal Processing	Paper Code:	EEEC61102
Maximum Marks:	40	Time duration:	3 Hours
Total No of questions:	08	Total No of Pages:	02
	<p>Note:</p> <ol style="list-style-type: none">1. Follow all the Instructions given on the cover page of the Answer Booklet Strictly.2. All parts of a Question should be answered consecutively.3. Each answer should start from a fresh page.4. Assumptions made if any, should be stated clearly at the beginning of your answer.		

Answer all the Groups
Group A

Answer all the questions of the following

$5 \times 1 = 5$

1. a) What do you mean by an “Adaptive Filter”?
b) Show that, $W_N^{2kn} = W_{N/2}^{kn}$
c) How many ways you can digitize an analog filter?
d) Write down the different application of advanced digital signal processing.
e) Given the specification
passband attenuation, $\alpha_p=1$ dB, stopband attenuation, $\alpha_s= 30$ dB,
passband frequency, $\Omega_p= 200$ rad/s and stopband frequency, $\Omega_s= 600$ rad/s.
Determine the order of the filter.

GROUP –B

Answer *any three* of the following

$3 \times 5 = 15$

2. Draw and explain the block diagram of a digital communication system used for echo cancellation in a modem.
3. Explain the process of digital watermarking using block diagram.
4. Write down short notes on Adaptive Direct-Form filter using LMS (Least Mean Squared) algorithm.
5. Find the linear convolution using circular convolution for two sequences
 $x(n)=\{1,2,-1,2,3,-2,-3,-1,1,1,2,-1\}$ and $h(n)=\{1,2\}$ using Overlap add method.

Or

Determine the frequency response of FIR filter defined by
 $y(n)= 0.25 x(n)+ x(n-1) + 0.25 x(n-2)$. Calculate the phase and group delay.

GROUP –C

Answer *any two* of the following

$2 \times 10 = 20$

6. a) Draw and explain the block diagram model for the generation of a speech signal.
b) How source encoding is possible for a speech signal? Explain with proper block diagram.

[5+5]

7. Compute 8-point DFT of the following sequence
 $x(n) = \{0.5, 0.5, 0.5, 0.5, 0, 0, 0, 0\}$ using DIT-FFT algorithm.

8. a) Draw and explain state space Kalman filter.
b) Write the necessary equations for state process model and observation model.

[7+3]
