

QUESTION BANK

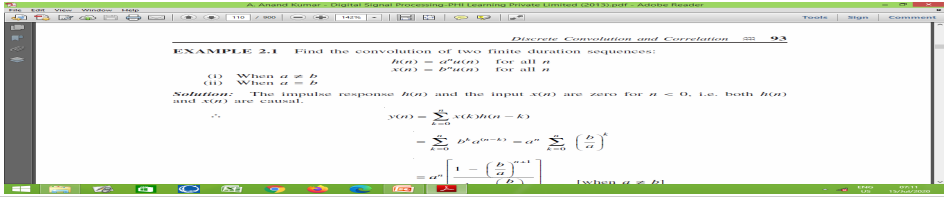
Class	Course Code	Course Title	
III Year EEE	22EE603	PRINCIPLES OF DIGITAL SIGNAL PROCESSING	
CO 1:	Illustrate the basics of discrete time signals and systems.		[U]
CO 2:	Interpret the concepts of Discrete and Fast Fourier transform		[U]
CO 3:	Comprehend the architecture of advanced processors		[U]
CO 4:	Apply the concept of transformation techniques in Discrete Time systems		[AP]
CO 5:	Design different types of filters using various filter design techniques.		[AP]

CO2: Interpret the concepts of Discrete and Fast Fourier transform

CO4: Apply the concept of transformation techniques in Discrete Time systems

Module –II: Discrete Fourier Transform and Fast Fourier Transform

Part – A		RBT	CO	Marks
1.	Obtain the circular convolution of the following sequences $x(n)=\{1,2,1\}$; $h(n)=\{1,-2,2\}$ by using matrix method.	AP	CO4	2
2.	Identify the value of $y(n)$ of the following sequence $x(n)=\{1,2,3\}$, $h(n)=\{1,1\}$ by using multiplication method.	U	CO4	2
3.	Write down the condition for linear convolution.	U	CO4	2
4.	Distinguish between linear and circular convolution of two sequences.	U	CO4	2
5.	Write down the condition for circular convolution.	U	CO4	2
6.	Determine the convolution sum of two sequences $x(n)=\{1,2,4,1\}$, $h(n)=\{1,-2,3,4\}$	AP	CO4	2
7.	Apply matrix method to find circular convolution of the two sequences $x(n)=\{1,2,2,1\}$ $h(n)=\{-1,2,3,4\}$	AP	CO4	2
8.	Consider the sequences $x_1(n)=\{0,1,2,3,4\}$, $x_2(n)=\{0,1,0,0,0\}$. Determine a sequence $y(n)$ so that $Y(k)=X_1(k) X_2(k)$.	AP	CO4	2
9.	Summarize the properties of the discrete fourier transform.	U	CO4	2
10.	State and Proof the periodicity property.	U	CO4	2
11.	Draw the flow graph of a two-point DFT for a decimation-in-time decomposition.	U	CO2	2
12.	Differentiate between DIT and DIF algorithm.	U	CO2	2
13.	Calculate the number of multiplications and additions are required to compute N point DFT using Radix-2 FFT.	U	CO2	2
14.	Infer the main advantages of FFT.	U	CO2	2
15.	Show the basic butterfly diagram for DIT algorithm.	U	CO2	2
16.	Infer how FFT improves computational efficiency compared to DFT.	U	CO2	2
17.	Outline the differences and similarities between DIF and DIT algorithm.	U	CO2	2
Part – B		RBT	CO	Marks
1.	Compute 4-point DFT of the sequence $x(n)=\{0,2,4,6\}$.	AP	CO4	8
2.	Find the IDFT of a sequence $Y(K)=\{1,0,1,0\}$	AP	CO4	8

	Perform the circular convolution of the following sequences $x(n)=\{1,1,2,1\}$, $h(n)=\{1,2,3,4\}$ using DFT method.	U	CO4	10
4.	Find the linear convolution using circular convolution for the inputs $x(n)=\{1,2,3,4\}$, $h(n)=\{5,6\}$	AP	CO4	6
5.	Determine the convolution sum of two sequences using graphical method $x(n) = \{1, 5, 6, 2\}$, $h(n) = \{-1, 0, 1, 2\}$	AP	CO4	8
6.	Determine the circular convolution of two sequences $x(n)=\{1,2,2,1\}$, $h(n)=\{1,2,3,1\}$ using (a) Concentric circle method (b) Matrix Method.	AP	CO4	16
7.	Perform circular convolution of the two sequences $x(n)=\{1,2,2,1\}$ & $h(n)=\{-1,2,3,4\}$	AP	CO4	8
8.	Determine the linear convolution of two sequences $x(n)=\{3,2,1,2\}$, $h(n)=\{1,2,1,1\}$	AP	CO4	16
9.	Determine the convolution of two sequences 	AP	CO4	8
10.	Using DFT-IDFT method, Determine the response of the system with impulse response $h(n)=\{1,2,1\}$ for the input $x(n)=\{3,2\}$.	AP	CO4	16
11.	Compute a 4-point DFT of the following sequences using DIF algorithm $x(n)=\{1,-1,1,-1\}$	AP	CO2	8
12.	Deduce the signal flow graph of radix-2 Decimation in time FFT algorithm for $N=8$.	U	CO2	8
13.	Compute an 8-point DFT of the sequences $x(n) = \{1, 0 \leq n \leq 7$ $0, \text{ otherwise}\}$ by using the decimation-in-frequency FFT algorithm.	AP	CO2	16
14.	Compute an 4-point DFT of the following sequences using DIT algorithm $x(n)=\{1,2,3,4\}$	AP	CO2	8
15.	Find the IDFT of the sequence $X(K)=\{10, -2+2j, -2, -2-2j\}$ using DIF-FFT algorithm.	AP	CO2	8
16.	Compute an 8-point DFT of the following sequences using DIT algorithm $x(n)=\{1,-1,1,-1,0,0,0,0\}$	AP	CO2	16
17.	Determine the IDFT of the sequence $X(K)=\{1, 1+j, 2, 1-2j, 0, 1+2j, 0, 1-j\}$ by using decimation-in-time FFT algorithm.	U	CO2	16
18.	Derive and illustrate the signal flow graph of the Radix-2 Decimation-in-Time (DIT) FFT algorithm for $N = 8$. Explain each stage of computation in detail, highlighting the butterfly operations and computational complexity.	U	CO2	16