

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]

CO1: Illustrate the basics of discrete time signals and systems.

Module –I: SIGNALS & SYSTEMS

Part – A		RBT	CO	Marks
1.	Find the even signal for the sequence $x(n) = \{2, -2, 6, -2\}$	AP	CO1	2
2.	Find the value of the signal $x(n) = \{-2, -1, 0, 2, 3, 4\}$ and $a=3$ if the function is $y(n) = ax(n)$.	AP	CO1	2
3.	Test Whether the signal is periodic or aperiodic signal $x(n) = \sin\sqrt{2}\pi n$.	AP	CO1	2
4.	Determine whether the signal $x(n) = e^{j\frac{\pi}{7}(n+\frac{1}{2})}$ is periodic or not.	U	CO1	2
5.	Test whether the given sequence is time variant or time invariant system $y(n) = nx^3(n)$	AP	CO1	2
6.	Check whether the systems are static or dynamic (i) $y(n) = x(2n)$ (ii) $y(n) = x^2(n)$	AP	CO1	2
7.	Check whether the systems are static or dynamic (i) $y(n) = x(n)x(n-1)$ (ii) $y(n) = x^2(n) + x(n)$	AP	CO1	2
8.	Write the formula for energy and power signal.	U	CO1	2
9.	Prove the given system $y(n) = 10x(n) + 5$ is nonlinear.	AP	CO1	2
10.	Identify whether the signal is Energy or Power signal $x(n) = u(n)$.	AP	CO1	2
11.	Identify whether the signal $x(n) = u(n)$ is Energy or Power signal.	U	CO1	2
12.	Check whether the systems are static or dynamic (i) $y(n) = x(n)x(n-1)$ (ii) $y(n) = x^2(n) + x(n)$	AP	CO1	2
13.	Define Sampling	U	CO1	2
14.	Draw the block diagram of DSP.	U	CO1	2
15.	Write down the formula for even and odd signal.	U	CO1	2
16.	Find the odd signal for the sequence $x(n) = n+2, 0 < n < 5$	AP	CO1	2

	Identify the value of the signal $X_1(n)=\{2,-1,1,4,3,2\}$ and $X_2(n)=\{-1,3,0,2,-2\}$ by applying the signal addition property.	AP	CO1	2
18.	Define Quantization.	U	CO1	2
19.	A system is defined by its impulse response $(n) = 2^nu(n - 2)$. Identify whether the system is stable or not.	AP	CO1	2
20.	Show when discrete time signals are called as periodic signals.	U	CO1	2
21.	Compare causal and non-causal system.	U	CO1	2
22.	Outline Nyquist sampling theorem.	U	CO1	2
23.	Outline the process of Quantization in Analog to digital conversion.	U	CO1	2
24.	Outline the necessary and sufficient condition for stability.	U	CO1	2
25.	A system is defined by its impulse response $(n) = 3^nu(n - 2)$. Identify whether the system is stable or not.	AP	CO1	2
26.	Construct the graphical plot of $x(-n)$ where $x(n)=\{1,2,-2,3,-1,2\}$.	AP	CO1	2
27.	Show $x(-n)$ in graphical representation where $x(n)=\{1,4,-2,3,-1,2\}$.	U	CO1	2
28.	Define sampling theorem	U	CO1	2
29.	Outline Nyquist sampling theorem with appropriate mathematical expression.	U	CO1	2

Part – B		RBT	CO	Marks
1.	Explain in detail the block diagram of analog to digital conversion process and also analyse the Aliasing effect using Nyquist sampling theorem.	AN	CO1	16
2.	Identify whether the following are energy or power signals. i) $x(n) = \left(\frac{1}{4}\right)^n u(n)$ ii) $x(n) = \sin\left(\frac{\pi}{3}n\right)$	AP	CO1	8
3.	Determine the values of power and energy of the following signals. Find whether the signals are power, energy or neither energy nor power signals. a) $x(n)=6 \cos(n/2)$ b) $x(n)=3(0.5)^n u(n)$	AP	CO1	10
4.	Check whether the following systems are dynamic, linear, time invariant, causal and stable. Justify your answers. y(n)=2x(n)+[1/((x(n-1)))] b) y(n)=nx ² (n)	AP	CO1	16
5.	Identify whether the signals are periodic or aperiodic. i) $x(n) = \cos\left(\frac{2\pi}{3}n\right)$ ii) $x(n) = \sin\left(\frac{\pi}{8}n^2\right)$	AP	CO1	8
6.	Find whether the following signals are periodic or not. If periodic, find the fundamental period and fundamental frequency. x(n)=sin(nπ/3).cos(nπ/5) x(n)=30 cos((n/8)-π)	AP	CO1	8
7.	Find whether the following signals are periodic or not. If periodic, find the fundamental period and fundamental frequency. i) $x(n)=\sin\frac{2\pi n}{3} + \cos\frac{2\pi n}{5}$ ii) $x(n)=\sin(3n)$	AP	CO1	8
8.	Determine the following signals are time variant or time invariant i) $y(n) = 6x(n)+3$ ii) $y(n) = \cos x(n)$	AP	CO1	6
9.	Identify the following discrete time system are Memory or memory less, Linear or Non linear, Time invariant or time variant system, Causal or non	AP	CO1	16

	causal and Stable or unstable. i) $y(n) = x(n) + n x(n+1)$ ii) $y(n) = x(-n+2)$ iii) $y(n) = x(n) + (1/x(n+1))$			
10.	Identify the following discrete time system are Memory or memory less, Linear or Non linear, Causal or non causal. i) $y(n) = nx(n)$ ii) $y(n) = x(-n+2)$	AP	CO1	8
11.	Find the time shifting $x(n-m)$ and $x(n+m)$ of the signal $x(n)=\{2,3,1,0,1\}$ and the value for $m=3$. Represent the signal in graphical representation.	AP	CO1	8
12.	Solve the even and odd signals for the following sequence i) $x(n)=n+2; 0 < n < 5$ ii) $x(n)=3^n$ iii) $x(n)=\{2,-2,6,-2\}$	AP	CO1	16
13.	Illustrate the Representation of Discrete-time signals with example.	AN	CO1	8
14.	Explain the Elementary discrete time signals.	U	CO1	8
15.	Solve the sequence by using the time scaling operation $x(n)=\{1,2,3,4,5,4,3,2,1\}$	AP	CO1	8
16.	Explain in detail the basic block diagram of DSP and sampling techniques.	U	CO1	10