Total number of printed pages: **02** **UG/5th Sem/UIE511**

2023

Digital Signal Processing

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

Q1.	a)	Compute the DFT of sequence x(n)=[5+3i, 4, 5-3i, -4]	05
	b)	Draw the complete signal flow graph of 4 points DIT FFT algorithm.	05
	c)	Draw the block diagram of linear convolution using DFT.	05
	d)	Write the names of five Basic time domain operation on sequence.	05
Q2.	a)	Draw the Block diagram of Digital Processing of an Analog signal.	05
	b)	Determine the power and RMS value of the following signals. $y(t) = 5\cos(50t + \pi/6)$	05
	c)	Determine the causal signal x(n) having the z-transform	05
	d)	Defined the Total Energy, Average Power and Energy sequence.	05
Q3.	a)	A discrete time causal system has a transfer function Determine the difference equation of the system	05
	b)	Compute the convolution of these pairs of signals	05
	c)	A discrete-time signal . Sketch and label	05
	d)	Compute the convolution of these pairs of signals	05
Q4.	a)	Find out the circular convolution, Where x[n]={1, -2, 4, 1.5}, h[n]={3, 0, -2, 5}.	05
	b)	What are the conditions for a system to be LTI systems.	05
	c)	A system has unit sample response $h(n)$ is given by $h(n) = -0.25\delta(n+1) - 0.5\delta(n) - 0.25\delta(n-1)$. Is the system is causal?	05
	d)	Write the 4th order difference equation.	05

Q5.	a)	Find out $u(n\text{-}1) - u(n-2)$	05
	b)	Check whether the following system is static or dynamic and also causal or non-causal system: $y(n) = x(2n)$	05
	c)	Write down the Classification of Systems.	05
	d)	Check for periodicity of	05
Q6.	a)	When a system is said to be memory less? Give Example.	05
	b)	State the significance of impulse response.	05
	c)	Define symmetric and anti-symmetric signals.	05
	d)	What is aliasing?	05
Q7.	a)	Find the inverse Z-transform of $X(z) = \frac{z(z^2-4z+5)}{(z-3)(z-1)(z-2)}$ for ROC (i) $2 < \|z\| < 3$ (ii) $\|z\| < 1$	10
	b)	What are the advantage of DSP?	05
	c)	Why are FFT techniques so important in digital signal processing?	05

**********End of UIE511**********