Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2020

Subject Code:2171708 Date:21/01/2021

Subject Name:Digital Signal Processing

Time:10:30 AM TO 12:30 PM Total Marks: 56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Give classification of signals.	**03**
	(b)	For given discrete time system check whether the given system is a Static/Dynami,Linear/Nonlinear,TimeVariant/Invariant,Causal/Noncausal, Y(n)= x(2*n)	**04**
	(c)	What is aliasing effect and how it can be eliminated?	**07**
Q.2	**(a)**	Draw & discuss typical block diagram of Digital Signal Processing	**03**
	(b)	Explain with suitable example recursive and non-recursive systems.	**04**
	(c)	Compute the convolution by graphical method between x(n)={-1,2,3,2,1} and y(n)={2,1,-1,1}	**07**
Q.3	**(a)**	ROC of Z-transform and enlist properties of ROC.	**03**
	(b)	Derive the Z transform for X(n) = u(-n-2) 2. X(n)=n^2u(n)	**04**
	(c)	Prove shifting and linearity properties of z transform.	**07**
Q.4	**(a)**	Show relationship between Z transform and DFT.	**03**
	(b)	Determine the causal signal x(n) having the z-transform X(Z)= $\frac{1}{(1-2z^{-1})(1-z^{-1})^2}$	**04**
	(c)	Prove differentiation and convolution properties of z transform.	**07**
Q.5	**(a)**	Compare DTFT with DFT.	**03**
	(b)	Calculate 4 point DFT of X(n)={0,1,2,3}	**04**
	(c)	List out the properties of DFT prove the symmetry property for DFT.	**07**
Q.6	**(a)**	Prove linearity property of DFT.	**03**
	(b)	Find IDFT of given sequence X(k)={12, -4+j4, -4, -4-j4}	**04**
	(c)	Find circular convolution of the sequences x(n)={1,2,3,4} and h(n)={2,1,2,1}.	**07**
Q.7	**(a)**	Explain term 'radix' for FFT algorithm	**03**
	(b)	Explain Low pass and high pass filter.	**04**
	(b)	Explain Impulse Invariance Method for IIR filter design	**07**
Q.8	**(a)**	Enlist difference between FIR and IIR Filter.	**03**
	(b)	Explain windowing Method for FIR filter design in brief.	**04**
	(b)	Explain Radix-2 Decimation In Time FFT algorithm.	**07**

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