Seat No.: \_\_\_\_\_ No.

## GUJARAT TECHNOLOGICAL UNIVERSITY BE SEMESTER- 7th EXAMINATION - SUMMER 2015

Subject code: 170706 Subject Name: Computer Signal Processing Time:02.30PM-05.00PM			Date: 06/05/2015
			Total Marks: 70
Instructions:			
		Attempt all questions.	
		Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
	5.	rigures to the right multate fun marks.	
Q.1	<b>(a)</b>	Draw the block diagram of a typical digital signal processing	07
	(b)	system. Explain the functioning of each block. What are the properties of Linear Time Invariant (LTI) Systems ?	07
	(0)	Give examples of LTI systems.	07
Q.2	<b>(a)</b>	Discuss the properties of z-transform.	07
	<b>(b)</b>	Determine the z-transform of the following:	07
		(i) $\mathbf{x}(n) = (-1/3)^n \mathbf{u}(n) - (-1/2)^n \mathbf{u}(-n-1)$	
		(ii) $x(n) = a^n$ , $0 \le n \le N-1$	
	<b>(b)</b>	<b>OR</b> Discuss the aliasing effects in sampling a continuous time signal.	07
	(b)	What is the solution to nullify this effect?	07
Q.3	<b>(a)</b>	Determine the inverse z-transform of the following:	07
		$(i)X(z) = (1+z^{-1})^2 / (1-(1/2)z^{-1})(1-z^{-1}),  z  > 1$	
		(ii)X(z)=log(1+az <sup>-1</sup> ), $ z  >  a $	
	<b>(b)</b>	Derive the expression of reconstruction of a bandlimited	07
		signal from its samples.	
0.2	(a)	OR What is a linear phase system? Discuss different types of	07
Q.3	(a)	What is a linear phase system? Discuss different types of FIR linear phase systems.	07
	<b>(b)</b>	Discuss the following structures to implement the discrete time	07
		systems:Direct form – I, Direct form – II., Cascade, Parallel form	
Q.4	(a)	Compare linear convolution with circular convolution of sequences with suitable examples.	07
	(b)	Discuss the effects of coefficient Quantization in IIR systems	07
		OR	
Q.4	<b>(a)</b>	Discuss the design of Discrete-time IIR filters with	07
		following transformations:	
	(b)	(i)Bilinear transformation (ii)Impulse invariance method What is windowing in FIR filter design?Discuss various	07
	()	windows.	01
Q.5	<b>(a)</b>	Discuss the Goertzel's algorithm.	07
	<b>(b)</b>	Discuss the properties of DFT.	07
Q.5	(a)	<b>OR</b> Discuss decimation-in-time FFT algorithm.	07
<b>V</b> .2	(a) (b)	What are the key architectural features of a typical Digital	07
	()	Signal Processor ? Discuss with any suitable Digital Signal	
		Processor currently available.	
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