Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII(NEW) • EXAMINATION – WINTER 2016

Subject Code:2172409 **Date:25/11/2016**

Subject Name:Digital Signal Processing for Power Electronics

Time:10.30 AM to 1.00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	For the system described by y(n) = x(-n) , determine whether the system is (i) Stable (ii) causal (iii) linear (iv) time – invariant and (v) memory less or not.	**07**
	(b)	List the applications of DSP in Power Electronics.	**07**
Q.2	**(a)**	Determine response y(n) of a filter using DFT & IDFT if x(n)={1,2} and h(n)={1,2,4}.	**07**
	(b)	Describe the effects of Quantization in the direct computation of DFT and FFT algorithm.	**07**
		OR	
	(b)	Derive the relationship between Z-transform and Discrete Time Fourier Transform (DTFT).	**07**
Q.3	**(a)**	State DFT and IDFT. Describe any three properties of DFT.	**07**
	(b)	Compute the 4-point DFT of a sequence x(n)={1,2,3,4} using radix-2 decimation in time FFT (DITFFT) algorithm.	**07**
		OR	
Q.3	**(a)**	Define the following terms: 1) ROC 2) Recursive system 3) LTI system 4) Non-recursive system 5) Aliasing 6) Impulse Response 7) Power density Spectrum	**07**
	(b)	Find the circular convolution of x(n)= {0,1,2,3} with h(n)= {2,1,1,2}.	**07**
Q.4	**(a)**	Derive and explain N-point radix-2 DIF FFT algorithm. For N=8 draw the signal flow graph.	**07**
	(b)	Discuss the parallel-form structure for first -order and second order sections of an FIR filter.	**07**
		OR	
Q.4	**(a)**	Obtain direct form-I and II realization of a system described by y(n) – ¾ y(n-1) + 1/8 y(n-2) = x(n) + ½ x(n-1)	**07**
	(b)	Explain the structures for realization of IIR systems.	**07**
Q.5	**(a)**	Discuss the Round off effect in digital filter.	**07**
	(b)	Describe Harvard type DSP architecture.	**07**
		OR	
Q.5	**(a)**	What are the different formats of fixed point representation? Explain the fixed point representation of binary numbers.	**07**
	(b)	Explain the concept of pipelining in DSP. Also discuss the need of interlocking in brief.	**07**

****