		GUJARAT TECHNOLOGICAL UNIVERSITY M. E SEMESTER – I • EXAMINATION – WINTER 2012	
Subi	ect co	de: 712601N Date: 08-01-2013	5
Subj	ect N	ame: Digital Signal Processing Algorithms and	,
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T:		Trocessor Arciniecture 20 mm - 05.00 mm - Total Mankar 70	
1 IIIIe	e: U2.3	50 pm – 05.00 pm – 10tal Marks: 70	,
Inst	ructio	ons:	
	1. A	Attempt all questions.	
	2. N	Aake suitable assumptions wherever necessary.	
	3. F	igures to the right indicate full marks.	
Q.1	(a)	Explain (i)Linear Time Invariant System (ii)Moving Average System	06
	(b)	(i)Check whether the system $v[n] = cosx[n]$ is time invariant	08
		 (ii)Check whether the systems described by following equations are BIBO systems. (a) y[n] =ax²[n] (b) y[n] =ax[n+1]+bx[n+1] 	00
Q.2	(a)	Define energy and power signal. Illustrate with example that if energy is infinite, power may be finite or infinite	07
	(b)	Derive Symmetry properties of the Fourier Transform for both real and	07
		complex sequences.	
		OR	
	(b)	Discuss the properties of the region of convergence for Z Transform	07
Q.3	(a)	Perform circular convolution of the sequences $p(n)=\{2,1,1,1\}$ and $q(n)=\{1,2,3,4\}$ by graphical method	06
	(b)	Which of the following are stable systems? Give reasons.	08
		(a) Ideal delay system (b) Memory less system (c) Accumulator (e) Compressor	
		OR	
Q.3	(a)	Find the Z transform of the following:	06
		(1) $x(n) = \alpha^{-} u(n)$ (11) $x(n) = \sin \omega_{o}(n)$	
	(b)	Obtain the system function $H(Z)$ for the system described by the difference equation,	08
		y(n) - 3y(n-1) + 2y(n-2) = x(n) - 2x(n-1)	
		Realize the filter using (i) Direct Form I and II and (ii) Cascade form	
0.4		Draw the structures neatly with system equations at different points.	07
Q.4	(a)	Find the impulse response of the system given by the difference equation	06
		$y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = 2x(n)$	
	(b)	Explain the properties of DFT.	08
• •		OR	~-
Q.4	(a)	Find the 4 point DFT of the sequence $x(n) = \cos \frac{n\pi}{4}$	07
Q.4	(b)	Explain the design of IIR filter using Impulse Invariance method.	07
Q.5	(a)	Define IDFT .Find the IDFT of $X(k) = \{1,2,3,4\}$	07
	(b)	Compare the architectures for standard microprocessor and the signal	07
		processing. Explain the concept of pipelining.	
c =		OR	<u> </u>
Q.5	(a) (b)	Explain Windowing Techniques for FIR filter design Given $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$ find $X\{k\}$ using DIT FFT algorithm.	07 07
