Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

M. E SEMESTER – I • EXAMINATION – WINTER • 2014			
Su	bject	code: 710422 Date: 06-12-2014	
Su	bject	Name: Digital Signal Processing and Application	
Tiı	me: 1	.0:30 am - 01:00 pm Total Marks: 70	
Ins	struc	ctions:	
	1.	Attempt all questions. Make suitable assumptions wherever necessary	
	2. 3.	Figures to the right indicate full marks.	
Q.1	(a)	Determine which of the following sinusoids are periodic and compute their fundamental period: (i) $\cos 3\pi n$ (ii) $\sin 3n$ (iii) $\sin(\pi n/4)$	07
	(b)	Determine if the systems described by following input-output relations are linear or non-linear (i) $y(n)=nx(n)$ (ii) $y(n)=x(n^2)$ (iii) $y(n)=x^2(n)$	07
Q.2	(a)	Determine the impulse response of the cascade of two LTI systems having impulse responses $h_1(n) = (0.5)^n u(n)$ and $h_2(n) = (0.25)^n u(n)$	07
	(b)	Explain convolution theorem for Fourier transform with an example. OR	07
	(b)	Explain time shifting property of Fourier transform with an example.	07
Q.3	(a) (b)	Determine the inverse z-transform of $X(z) = log(1+az^{-1})$ where $ z > a $ Determine the z-transform of the signal $x(n) = cos(\omega_0 n) u(n)$	07 07
	(~)	OR	01
Q.3	(a) (b)	Explain properties of ROC of z-transform. State and prove time reversal property of z-transform.	07 07
Q.4	(a) (b)	Define discrete Fourier transform. Relate it with DTFT. Compute DET of the sequence $x(n) = \{0, 1, 2, 3\}$	07 07
	(0)	OR	07
Q.4	(a)	Define inverse discrete Fourier transform and give an example of computing the same.	07
	(b)	With the help of an example, relate circular convolution with linear convolution.	07
Q.5	(a) (b)	Give differences between FIR and IIR filters.	07
	(0)	OR	07
Q.5	(a) (b)	Compare DIT and DIF FFT algorithms. Explain bilinear transformation method for IIR filter design.	07 07
