E&TC

College of Engineering Pune

E &TC Department

T.Y.B.Tech

Digital Signal Processing

End Semester Examination, November 2012

Time:3hrs | Date:24th Nov 2012

Instructions: | Max. Marks 50

All questions are compulsory

Assume suitable data if necessary

Figures to right indicates marks allotted to the questions

Q.No. 1 a) A discrete time system has a unit sample response h(n) given by **3**

$$h(n)=\frac{1}{2}\delta(n)+\delta(n-1)+\frac{1}{2}\delta(n-2)$$

i)Find the system frequency response .
ii)Find the response of the system to x(n)=5 cos(πn/4)
iii)Find Transfer function and comment on the stability of the system.

b) Find inverse transform of **3**

$$X(n)=\frac{z}{3z^2-4z+1}$$

When the ROC is a) $|z|>1,.....and....|z|<\frac{1}{2}$

c) Compare direct form I and Direct form II realization of IIR systems **3**

	d)	List the problems of finite word length in digital filter.	3
Q. No. 2	a)	What is Multirate Digital Signal Processing Discuss direct form I Structure implementation for multirate DSP.	5
	b)	How sampling rate can be converted using I/D rational factor	4
Q.No.3	a)	What is the cause of frequency warping? What is the cause of this effect?	3
	b)	Find the transfer function H(s) for the normalized Butterworth filter of order 2.	3
Q.No.4	a)	Design low pass IIR Digital filter with a maximally flat magnitude characteristic. The passband edge frequency is $\omega_p = 0.25\pi$ with a passband ripple not exceeding 0.5 dB. The minimum stopband attenuation at the stopband edge frequency of $\omega_s = 0.55\pi$ is 15dB.	6
	b)	Compare impulse invariant method and bilinear transform method with approximation method.	3
Q. No.5	a)	Find (8-point) DIF FFT for a sequence. x(t)={1 2 2 2 0 1 1 1} Verify result by finding Inverse FFT.	5
	b)	Discuss FIR filtering method using windowing technique.	3
Q.No.6	a)	What is time aliasing?	3
	b)	Derive equation for circular convolution.	3

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