Code No: A6502 **NR**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I Semester Examinations, April/May 2012
ADVANCED DIGITAL SIGNAL PROCESSING
(WIRELESS AND MOBILE COMMUNICATIONS)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks

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1.a) Compute the N point DFT of the given sequence $x(n) = (-1)^n$ for N = 16.
b) List out the differences between linear convolution and circular convolution.

2.a) Mention the properties of Twiddle factors.
b) For given x(n) = {4, 5, 6, 7, 7, 6, 5, 4}, compute FFT coefficients using DIT algorithm.

3. Design a chebyshev lowpass digital filter to satisfy the following specification.
Passband frequency = 1600 π rad/sec.
Stopband frequency = 3200 π rad/sec.
Passband attenuation = 0.5 dB
Stopband attenuation = 45 dB.
Transfer the analog filter to digital filter using bilinear transformation by taking T = 0.2 sec.

4.a) What are the desirable characteristics of the frequency response of window function?
b) Design a FIR lowpass filter with cutoff frequency of 0.5 kHz, sampling rate of 2 kHz and with 7 samples of impulse response using fourier series method.

5.a) Discuss a method to decrease the sampling rate of a signal by an integer factor D.
b) Consider the signal $x(n) = a^n u(n)$, $|a| < 1$.
i) Determine the spectrum $x(\omega)$.
ii) The signal x(n) is applied to a decimator that reduces the rate by a factor of 2. Determine the output spectrum.

6.a) Explain Blackman Tukey method of power spectrum estimation.
b) Compare the computational requirements for Bartlett and Blackman-Tukey power spectrum estimate.

7.a) Explain the Burg Method of power spectrum estimation.
b) What are the disadvantages of Burg Method?

8.a) Why errors are created in A/D process?
b) For second order I IR filter $H(z) = \frac{1}{(1-0.5z^{-1})(1-0.45z^{-1})}$.
What is the effect of shift in pole location with 3-bit coefficient representation in direct form?

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