B.Tech Degree VI Semester Examination April 2011

CS/EE 602 DIGITAL SIGNAL PROCESSING
(2006 Scheme)

Time : 3 Hours

Maximum Marks : 100

PART - A
(Answer *ALL* questions)

(8 x 5 = 40)

I.   (a)   Check the linearity, causality and time invariance of the system $y(n) = n \times (n)$.

          (b)   What is a system function? Explain its significance.

          (c)   State and prove the convolution property of DFT.

          (d)   Distinguish between DFT and DTFT.

          (e)   Explain the concept of windowing in FIR filter.

          (f)   Compare the performance of FIR and IIR filters.

          (g)   Explain any one of the application of DSP.

          (h)   Explain the quantization error in analog to digital conversion.

PART – B

(4 x 15 = 60)

II.   Find the Z - Transform of the following :

       (i) $x(n) = n\, a^{n-1}$

       (ii) $x(n) = a^n\, u(n)$

       (iii) $x(n) = \cos(\theta n) u(n)$ (15)

OR

III.   Find the inverse Z - Transform of

       (i) $x(z) = 1 + 3z^{-1}/1 + 3z^{-1} + 2z^{-2}$ $ROC \,/z/ > 2$

       (ii) $x(z) = (1/4)^* z^{-1}/(1 - 1/2^* z^{-1})(1 - 1/4^* z^{-1})$ $ROC \,/z/ > 1/2$

       (iii) $x(z) = 1/z^2 - 1.2z + 0.2$ $ROC \,/z/ > 1$ (15)

IV.   Find the output response of the LTI system with impulse response $h(n) = (111)$, excited by an input $x(n) = \{10101\}$ using FFT algorithm.   (15)

OR

V.   (a)   Find the 8 point DFT of the sequence $x(n) = \{1,2,3,4,4,3,2,1\}$ and plot the magnitude and frequency response.   (5)

          (b)   State and prove *any two* property of DTFT.   (10)

VI.   Obtain the Direct form II, Cascade and parallel form realization for the system

$$y(n) = -0.1y(n-1) + 0.2y(n-2) + 3x(n) + 3.6x(n-1) + 0.6x(n-2) \quad (15)$$

OR

VII.   Obtain the cascade form realization and parallel form realization of the following

$$H(z) = (1 + 0.5z^{-1})(1 + 0.25z^{-1})/(1 - 0.5z^{-1})(1 - 0.25z^{-1})(1 - 0.125z^{-1}) \quad (15)$$

VIII.   With block diagram explain the architecture of TMS320C54x fixed point processor.   (15)

OR

IX.   With block diagram explain the architecture of TMS320C4x floating point processor.   (15)

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