B.E Full Time Degree EXAMINATIONS,April /May 2014

Fourth Semester, EEE / R- 2008

EE 9254 Digital Signal Processing

Time: 3 Hours Max. Marks: 100

Answer ALL Questions

PART – A (10 x 2 = 20 Marks)

1. Determine if the following y(n)=x(-n-5) is Causal, Time -invariant system?
2. Give the difference between aperiodic, asymmetric & random signals.
3. Given x(n)={2,-1,0,-2} , y(n)={2,0,-1,1} find H(z)
4. Find the inverse of z-transform of $1/ (1- 1.5Z^{-1}+ .5Z^{-2})$?
5. State the difference between Floating & Fixed point computation.
6. Explain the need for zero padding ?
7. What is the advantage of windowing on spectral response?
8. Write briefly on the effect of warping on magnitude and phase response?
9. What is product round off error & truncation error?
10. What is the role of the pipeline operation in a DSProcessor? .

PART – B (5 x 16 = 80 Marks)

11 . Derive the Frequency response of the system described by, Y(n)=2x(n)+.5y(n-2) and obtain the magnitude & phase response plot. (8+8)

12 a) For the sequence x(n) = {1,-1,-2,-2}, h(n)={-2,-1,-3,-1}. Obtain the linear convolution, circular convolution, Z- transform of sequences and transfer function of system. (16)

(OR)

12 b) Write on any TWO of the Following: (8+8)

(i) Z-transform of $x(n)= \cos w_0 n$ for $n \geq 0$

(ii) Compute the ROC, stability for y(n)=y(n-1)+y(n-2)+x(n-1) if x(n) is input & y(n) is the output.

(iii) Aliasing effect during Low pass to High pass filter transformation

13 a) Explain the Butterfly structure. Compute the 8-point DFT by radix 2 DIT-FFT given x(n)={-2,1,1,-2,-1,2,-1,2}. (4+12)

(OR)

13 b)Give the stepwise procedure to Compute the 8 point DFT using radix 2 DIF-FFT. What is advantage of the radix2-FFT, the bit reversal and twiddle factor computed in this algorithm? (12+4)

14a) For the following analog transfer function

$H_a(s) = \frac{2}{(s+1)(s+2)}$ Determine H(z) if T=0.5 using

Impulse Invariance method

Bilinear transformation method. (8+8)

(OR)

14 b) Explain on the choice and type of windows selection for signal analysis. Compare numerically the effect of Hamming and Hanning windows and design the filter if

Hd(ejw) = 1; for $\frac{\pi}{4} \leq |w| \leq \pi$

=0; for $|w| \leq \frac{\pi}{4}$

Find the values of h(n) for N=11.Find H(z).Plot the magnitude response. (8+8)

15a) Write Briefly on any TWO of the Following: (8+8)

i) block diagram representation for the functional stages of DSProcessor

ii) Addressing Modes of a DSProcessor

iii) Multiplier Accumulator unit of one type of a DSProcessor

(OR)

15 b) With neat figures explain the Architecture for one type of Digital Signal Processor with specifying the special function registers and give one application. (16)