TE (ETRX) – Sem VI – CBSGS – 03/06/2019

Time : 3 Hrs **Marks : 80**

N.B.

1) Question number ONE is compulsory.

2) Attempt any THREE questions from remaining questions.

3) All questions carry equal marks.

Q1] Answer any four questions

a) Differentiate between bilinear ZT and impulse invariant method 5

b) Compute 4-point DFT of a causal four sample sequence given by,
X(n)= { j, 0, j, 1 } 5

c) Explain the effect of quantization in computation of DFT 5

d) Verify Parseval's theorem for sequence x (n)=$(\frac{1}{2})^n$ u(n). assume N=4.

e) Differentiate between DSP processor and microprocessor 5

Q2] a) Find DFT of the following sequence using DIT FFT algorithm. 10

x(n) = { -1 -1 2 0 2 0 2 0 } and sketch the magnitude and phase response.

b) Let x be a finite sequence with DFT

$X = \text{DFT}[x] = [0, 1+j, 1, 1-j]$

Using the properties of the DFT determine the DFT's of the following:

i) $y[n] = e^{j(\pi/2)n}\, x(n)$

ii) $y[n] = \cos(\pi/2)n\ \ x(n)$

iii) $y[n] = x[(n-1)_4]$

iv) $y[n] = [0, 0, 1, 0] \circledast x[n]$ with $\circledast$ denoting circular convolution 10

Q3] a)Design a Butterworth digital IIR low pass filter using Bilinear transformation by taking

T=0.5 second, to satisfy the following specifications.

$0.707 \le |H(e^{jw}| \le 1.0 \ : \ 0 \le w \le 0.45\pi$

$|H(e^{jw}| \le 0.2 \ : \ 0.65\pi \le w \le \pi$ 10

b) Given that,

$H(s) = s^3/((s+1)(s^2+s+1))$.

Find H (Z) using Bilinear Transformation method, for T=1 10

Q4] a) Explain special features of TMS 320 c67XX DSP processor. 10

b) Consider the LTI system governed by the equation, y(n)+0.8301y(n-1)+0.7348y(n-2)= x(n-2)

Discuss the effect of coefficient quantization on pole locations, when the coefficients are quantized by (i) 3 bits by truncation and (ii) 4 bits by truncation 10

Q5] a) Design a linear phase FIR low pass filter using rectangular window by taking 7 samples of window sequence and with cutoff frequency wc=0.2π rad/sample. 10

b) Explain with neat diagram application of DSP processor in biomedical signal processing

Q6] Write short notes on **(any two)** 20

a) Addressing modes of DSP processor? Where they are used.
b) Frequency transformation in digital domain
c) DMA controller, Memory organization of TMS320C6713

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