ETRX VI (CBGS) DSPP 1/6/16

Q.P. Code : 592000

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **three** questions from remaining questions.
(3) Assume suitable **data** wherever **necessary**.

1. (a) Explain Quantization and effects of truncation and rounding. **20**
(b) Compare Butterworth and Chebyshev filters.
(c) What is DTFS. Find DTFS of
$x(n) = \{0,1,2,3\}$ with period, $N = 4$.
(d) Explain the concept of Pipelining in Digital Signal Processors.

2. (a) If $X(n) = n+1$ and $N = 8$, Find $X(k)$ using DIF-FFT algorithm. **10**
(b) Given $X(k) = \{20, -5.828 - j2.414, 0, -0.172 - j\,0.414, 0, -0.172+j\,0.414, 0, -5.828+ j2.414\}$ Find the sequence $x(n)$ using Inverse FFT algorithm. **10**

3. (a) Design a Butterworth digital IIR Lowpass filter using Impulse Invariant transformation method for the following specifications. **10**

$0.707 \leq |H(e^{iw})| \leq 1.0$ for $0 \leq w \leq 0.3\pi$

$|H(e^{iw})| \leq 0.2$ for $0.75\pi \leq w \leq \pi$

(T = 1sec)

(b) Write down design steps for FIR filter using window techniques. Compare windows. **10**

4. (a) A discrete time system has a tansfer function **10**

$$H(z) = \frac{1}{1 - 0.8z^{-1} + 0.12z^{-2}}$$

A four bit processor is used in which MSB represents sign bit and remaining 3 bits store quantized co-efficients.

(i) What is the effect of quantization on pole location if direct form II is used for relization.
(ii) If cascade form is used for relization, then what is the change in the pole values after quantization.
(iii) In which case (direct form II or Cascade) the shift from the actual pole location due to quantization is less?

(b) Explain the following terms. **10**

(i) Zero input limit cycle
(ii) Dead band
(iii) Truncation
(iv) Rounding

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5. (a) Explain Von-Neumann Architecture, Harvard Architecture and modified Harvard architecture in details. How architecture of advanced Digital signal processor is different from modified Harvard architecture. 10
   (b) Explain VLIW Architecture in detail. 10

6. Write short notes on 20
   (a) Gibb's phenomenon
   (b) Applications of Digital Signal Processors in Biomedical and Audio
   (c) Frequency Transformation in IIR filters.
