Code No. 6339 / M

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II – Semester (Main) Examination, June 2014

Subject: Digital Signal Processing

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A

1 Find DTFT of $\left[\frac{1}{4}\right]^n$ u(n+4).

2 Find the circular convolution of $x_1(n) = \{1, 1, 1, 1\}$ and $x_2(n) = \{1, 2, 2, 1\}$.

3 What is meant by in-place computation in FFT?

4 What are the differences and similarities between DIF and DIT algorithms?

5 Differentiate between bilinear transformation and impulse invariant transformation techniques.

6 Explain finite word length effects.

7 Explain Gibb's phenomenon.

8 State and prove the properties of twiddle factor.

9 Using IIT obtain H(z) if $H(s) = \frac{1}{(s+1)(s+2)}$. Assume T = IS.

10 Explain about the need for ASP.

PART – B

11 (a) Check for the stability and causality of the following systems
(i) $h(n) = x^2(n)$ (ii) $h(n) = x(-n)$
(b) Determine and sketch the magnitude and phase response of the given system
$y(n) = \frac{1}{3}[x(n) + x(n-1) + x(n-2)]$

12 Determine IFFT using DIT method for X(k) = {4, -6, 8, -10, 12, -3, 2, -1}.

13 Design an ideal HPF whose desired frequency response is
$H_d(e^{jw}) = \begin{cases} 1 & \pi \le |w| \le 0.6\pi \\ 0 & \text{Otherwise} \end{cases}$ Using Hamming window for N=9.

14 Design a Butterworth High Pass digital filter with following specifications.
$|H(e^{jw})| \le 0.2 \quad 0 \le w \le 0.2\pi$
$0.8 \le |H(e^{ju})| \le 1 \quad 0.6\pi \le w \le \pi$
Using Bilinear Linear Transformation.

15 (a) Draw the architecture of TMS320C 54XX processor.
(b) Explain the various addressing modes used in TMS 320C 54XX processor.

16 (a) Explain the algorithm to increase the sampling frequency by a factor I.
(b) What are the applications of multirate signal processing?

17 (a) Differentiate between FIR and IIR filters.
(b) Write the effects due to finite word length realizations.

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