Code No. 6115 / S

FACULTY OF INFORMATICS

B.E. 3/4 (IT) I-Semester (Suppl.) Examination, July 2014

Subject : Digital Signal Processing

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

Note: Answer all questions of Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Give the classification of Discrete Time Systems. (3)
2 State the circular time shift and circular convolution properties of DFT. (2)
3 Write the features of different windows used in FIR filter design. (3)
4 What are the conditions to be satisfied for constant phase delay in linear phase FIR filters? (2)
5 Why physically realized and stable IIR filters cannot have linear phase? (2)
6 What are finite word length effects in digital filters? (3)
7 Explain about the MAC unit used in programable DSPs. (3)
8 Assuming the current contents of AR3 to be zooh. What will be the contents after each of the following TMS320CS4 XX addressing modes are used. (2)
(i) * AR3 + 0 (ii) * AR3
9 List out the different applications of DSP's. (3)
10 Explain how a PPM signal is used for encoding two biomedical signals. (2)

PART – B (50 Marks)

11 (a) Find the IDFT of the sequence
X(K) = {4, 1 - J 2.414, 0, 1-Jo.414, 0, 1-J0.414, 01 + J2.414} using DIT algorithm (6)
(b) Perform the linear convolution of finite duration sequences
h(n) = {3, 2} and x(n) {1, 2, -1, 3, 2, -3, -2, -1}

12 (a) Explain the concept of linear phase FIR filter design using different windows and list out the merits and demerits of each windows. (6)
(b) Realize the cascade and parallel structures of the system governed by the difference equation (4)
y(n) -3/10 y(n-1)-1/10 y(n-2) = x(n) + 1/9 x (n-1)

13 (a) Design a Butterworth digital IIR high pass filter using Bilinear transformation by taking T = 0.3 second to satisfy the following specifications.
$0.45 \le |H(e^{jw})| \le 1.0$ for $0.8\pi \le w \le \pi$
$|H(e^{jw})| \le 0.15$ for $0 \quad \pi \le w \le 0.675\pi$ (6)

(b) For the analog transform function $H(s) = \frac{(s+1)}{(s+2)(s+4}$ H(z) using impulse invariant transformation if (i) T = 1S (ii() t = 0.5 S (4)

14 (a) Explain in detail the concept of pipelining in a DSP processor. (6)
(b) Identify the addressing mode of the source operand in each of the following instructions. (4)
(i) ADD * AR2 + , A (ii) ADD * AR2 + %, A
(iii) ADD 1234h, A (iv) ADD * AR2 + OB, A

15 Explain in detail the architecture of TMS320OC54XX processor with a neat diagram. (10)

16 (a) Test whether the following systems are time invariant or not (4)
(i) y(n) = n x(n) (ii) y(n) = x (2n) (iii) y(n) = $e^{x(n)}$ (iv)y(n) = x(n) + x(n+1)
(b) Explain the direct form -I and direct form II realizations of IIR filters. (6)

17 Write short notes on the following: (10)
(a) Design of optimum equiripple linear phase FIR filters (3)
(b) Addressing modes of programmable DSPS (4)
(c) DSP and bio-telemetry receive (3)

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