S.34

Code No.: 9A04603/R09

Set-4

III B.Tech. II Semester Regular & Supplementary Examinations

April/May - 2013

DIGITAL SIGNAL PROCESSING

(Common to EIE, E.Con.E, ECC and ECE)

Time: 3 Hours | Max. Marks: 70

*Answer any **FIVE** Questions*

*All Questions carry **Equal** Marks*

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1. Check for causality and stability of following systems,

   (i) $y(n) = x(n-1) + x(n) + x(n+1)$

   (ii) $y(n) - 2y(n-1) + y(n-2) = x(n) - x(n-3)$.

2. Given the two sequences,

   (a) $x_1(n) = 1 \quad 0 \le n \le 3$

   (b) $x_2(n) = (-1)^n \; 0 \le n \le 3$

   Find circular convolution of above sequences. Also verify the answer with DFT method.

3. (a) Explain how many complex computations are required to compute N-point DFT?

   (b) Find DFT of sequence using DIT-FFT x(n) = {1/2,1/2,0,0}.

4. Discuss the following,

   (i) IIR filter structures

   (ii) FIR filter structures

   (iii) Canonic and Non-canonic structures.

5. (a) Discuss the mapping s-domain to z-domain using backward difference method.

   (b) Convert following analog filter transfer function into digital filter transfer function using backward difference method $H(s) = 1/(s^2 + 0.9)$.

6. (a) What is the linear phase filter? Give the conditions under which FIR system will have linear phase.

   (b) What are the desirable features of windowing functions?

7. Implement a two stage decimator for the following specifications. Sampling rate of the input signal = 21,000 Hz.

   M = 100

   Passband = 0 to 50 Hz

   Transitionband = 50 to 70 Hz

   Passband ripple = 0.01

   Stopband ripple = 0.002.

8. Discuss in detail about time domain operations used in musical sound processing.