S.20

Code No.: 9A04603/R09

Set-3

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 the following systems described with difference equations for linearity, shift invariance, memory and causality

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

   (ii) $y(n) - 2^n y(n) = x(n)$.

2. (a) Discuss the relationship of DFT with Z-transform.

   (b) State and prove periodicity property of DFT.

3. (a) What is the need for FFT?

   (b) Find DFT of sequence using DIF-FFT $x(n) = \{1,1,1,1\}$.

4. (a) Explain transposed form realization.

   (b) Realize following filter system function in cascade form,

   $H(z) = (1 - z^{-1})^3/(1 - 0.5\,z^{-1})(1 - 0.25\,z^{-1})$.

5. Obtain the analog filter transfer corresponding to filter order of 3 and 4, consider Butterworth approximation.

6. (a) Explain the type-II frequency sampling method of designing FIR filter.

   (b) Explain the process of windowing using illustrations.

7. Compare the single stage and two stage realization of decimator with the following specifications. Sampling rate of a signal has to be reduced from 10 kHz to 500 Hz. The decimation filter H(z) has the passband edge of 150 Hz, stop band edge of 180 Hz, passband ripple of 0.002 and stopband ripple of 0.001.

8. (a) Explain about STFT.

   (b) Discuss the need for signal compression.