JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH I SEMESTER EXAMINATIONS APRIL/MAY-2012
ADVANCED DIGITAL SIGNAL PROCESSING
(COMMON TO EMBEDDED SYSTEMS, DIGITAL SYSTEMS & COMPUTER ELECTRONICS,
ELECTRONICS & COMMUNICATION ENGINEERING, EMBEDDED SYSTEMS & VLSI DESIGN,
VLSI & EMBEDDED SYSTEMS, VLSI SYSTEM DESIGN)

Time: 3hours   Max.Marks:60

Answer any five questions
All questions carry equal marks
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1.a)   Define Multi-rate Signal Processing and hence discuss Up-sampling and Down-sampling.
  b)   Discuss the process of performing sampling rate conversion by an rational factor I/D.

2.a)   Discuss the application of multistage signal processing for cascade implementation and hence bring out the optimum filter requirements?
  b)   The bandwidth of a sequence x(n) is 3.4 KHz and its sampling rate is to be reduced, by decimation from 240 KHz to 8KHz. Assume that an Optimal FIR filter is to be used, with an overall pass band ripple 0.08 and stop band ripple 0.001.Design an efficient Three Stage Decimator and hence calculate Multiplications per second and Storage requirements.

3.a)   Discuss how the variance of the power spectrum can be reduced using Bartlett method of power spectrum estimation.
  b)   Discuss any one application of power spectrum estimation.

4.a)   Discuss the procedure of estimating the power spectrum using parametric methods.
  b)   Discuss AR, MA and ARMA models of power spectrum estimation and write a detailed note of Yule-Walker method of power spectrum estimation.

5.a)   Bring out the relationship between Forward and Backward Prediction errors
  b)   Discuss the method of estimating predictor coefficients using Schur Algorithm and how it is different from Levinson Durbin algorithm w.r.t computations and structure.

6.a)   Define Finite Word Effects and discuss the same w.r.t various realization structures of FFT filters.
  b)   Define Scaling and discuss in detail how it prevents overflow error.

7.   Discuss any two applications of Multi-rate signal processing in detail

8.   Write short notes on
  a)   Fixed and Floating Point DSP systems.
  b)   Welch method of power spectrum estimation.

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