Code No: C9301 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I - Semester Examinations, April/May-2012
ADVANCED DIGITAL SIGNAL PROCESSING
(SYSTEMS AND SIGNAL PROCESSING)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks

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1.a) Define DFT and IDFT.
b) Find the DFT of the given sequence x(n) = {1,2,3,4}.
c) Plot the signals and their corresponding spectra for rational sampling rate conversion by a) I/D = 5/3 and b) I/D = 3/5. Assume that the spectra of input signal x(n) occupies the entire range $-\pi \leq \omega_x \leq \pi$.

2.a) Explain the process of down sampling the signal by a non-integer factor with a neat block diagram and necessary expressions.
b) Explain the implementation of Polyphase structure for Interpolators.

3.a) Prove that Periodogram is an inconsistent estimate of power spectral density.
b) Compare Parametric and Non-Parametric methods of power spectrum estimation.

4.a) Discuss AR, MA and ARMA models of power spectrum estimation.
b) Discuss the method of power spectrum estimation using Yule-walker method.

5. Discuss how to solve normal equations using schur algorithm and also show that it requires computations of order O(p) compared to Levinson algorithm which requires computations of order $O(p^2)$?

6.a) Discuss the effects occur due to finite word length representation in Direct form – I and II structures. w.r.to IIR filters.
b) Discuss the effect of quantization of coefficients in FIR filters.

7. Write short notes on
a) Blackman-Tukey method of power spectrum estimation.
b) Design of Phase shifters.

8. Define the following terms with an example.
i) Finite Word length Effects
ii) Limit Cycles.
iii)Truncation Error
iv) Round-off error
v) Dead band effects
vi)Over-flow error.

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