NR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH II SEMESTER EXAMINATIONS, APRIL/MAY-2012
ADVANCED DIGITAL SIGNAL PROCESSING
(POWER ELECTRONICS & ELECTRIC DRIVES)

Time: 3hours   Max. Marks: 60

Answer any five questions
All questions carry equal marks
- - -

1.a) Explain clearly the basic requirements of Digital filter realization and hence bring out the necessary building blocks and their features.
  b) What do you understand by the term linear phase and discuss the conditions for linear phase requirement?
  c) By using block diagram analysis approach, find the transfer function H (z) of the following circuit shown in fig 1.
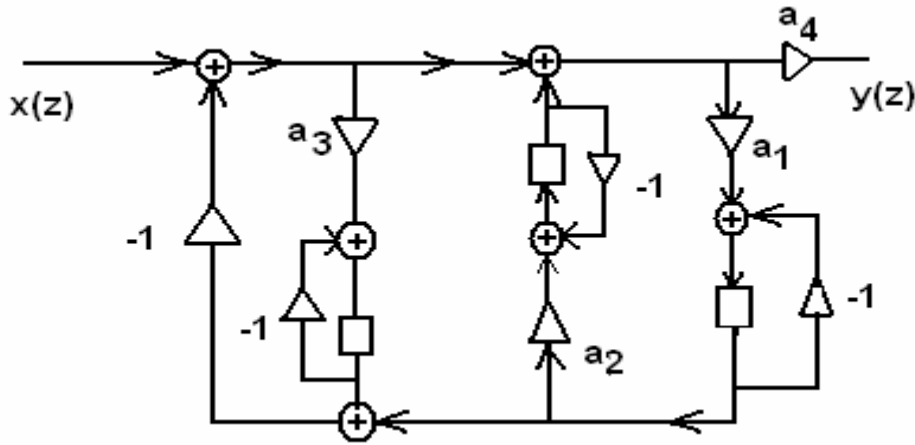

Fig.1

2.a) What is the structure of all pass filters? Analyse the input/output relation of all pass filters.
  b) Explain the design procedure of sine–cosine generator and discuss the issues involved in the implementation of it.

3.a) Explain clearly the procedures for design of IIR digital filters and hence bring out the constraints in the design of IIR filters using Analog structures.
  b) Design the low pass butterworth filter with specifications given below:
      Cutoff frequency: 2.1 KHZ
      Attenuation ½ dB.
      Minimum attenuation: 30 dB at 8 KHZ.

4.a) Discuss clearly about frequency transformation using DFT and IDFT pair and bring out the computational complexity involved. Determine the order of computations required and suggest methods to reduce it.
  b) What do you understand by the term tunable filters? Explain clearly about them.

5.a)   Explain about the representation off numbers in digital processing and hence explain the procedure for coefficient quantization.
  b)   Determine the quantization noise power in case of coefficients quantization.

6.a)   Distinguish clearly between truncation and round off incase of finite word length representation and obtain expression for error in case of fixed-point sign magnitude and 1's complement methods.
  b)   Determine the noise variance due to input noise for the system given by
$$H_{(z)} = \frac{0.8z}{z - 0.4}.$$

7.a)   Explain the problems involved in the power spectral estimation and bring out various reasons for it.
  b)   Determine the role of length of observation sequence in power spectral estimation using Periodgram method and Auto correlation method.

8.a)   What is the basic principle of parametric methods in power spectral estimation? Discuss various techniques in parametric method.
  b)   Obtain the relation between model parameters and the Auto correlation coefficients in AR Model spectral estimation.

****