B. Tech.

(SEM. VIII) EXAMINATION, 2007

ADVANCE DIGITAL SIGNAL PROCESSING

Time : 3 Hours]  [Total Marks : 100

Note : Attempt all questions. All questions carry equal marks. Notations have their usual meaning.

1  Attempt any four parts from the following :  5×4
   (a) Describe the advantages of digital signal processing over analog signal processing.
   (b) Discuss the successive approximation method for A to D conversion.
   (c) Describe the PWM for discretisation process.
   (d) Describe the characteristics of F I R and I I R systems.
   (e) What is quantisation error? How can it be minimised?

2  Answer any four of the following :  5×4=20
   (a) For the given transfer function of 2nd order analog low-pass and high-pass filter show its realisation in digital form using bilinear transformation (Z transform).
   (b) Describe the schematic block diagram of a digital signal processor.

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(c) Describe a signal flow diagram. The presentation of a 2nd order low pass filter in digital form.

(d) Describe the uniform window design technique of an FIR filter.

(f) Describe the design of a Butterworth high pass filter by inverse invariant transformation.

3 Answer any two of the following: 10\times2=20

(a) What is FFT? Describe an algorithm for decimation in time FFT.

(b) What is DFT? How can it be used to compute the N equidistant samples of the Z transform of an N-point sequence, on a circle of radius r?

(c) Draw the direct form 1 and direct form 2 realisations of an FIR system of even order with linear phase.

4 Answer any two of the following:

(a) Describe the Hamming window design technique for FIR filter.

(b) Describe the circular and linear convolution in FFT.

(c) Describe the matrix representation for realisation of IIR system.

5 Answer any two of the following:

(a) Describe the realisation of a lattice and ladder system.

(b) Describe architecture of a Digital Signal Processor with reference to hardware realisation (DSP Chip).

(c) Describe the Kaiser window design technique. What are the characteristics of an optimal design?