Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Electronics & Computer Engg.) (2011 Onwards) (Sem.–6)

DIGITAL SIGNAL PROCESSING

Subject Code : BTEC-502

Paper ID : [A2347]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1 Answer briefly :

A What do you mean by LTI system? Explain.

B What do you mean by cross correlation? Explain.

C Define DFT and List its computational requirements.

D Explain time shifting property of Z-transform.

E What do you mean by pass band ripple? Explain.

F Write down the various advantages of digital filters.

G List the properties of Hamming and Hanning windows used for FIR filter design.

H Write down the various advantages of DSP processor.

I What do you mean by limit cycles? Explain.

J Explain the property of linear phase in FIR filters.

SECTION-B

2 What is digital signal processing? Discuss its different benefits and applications in detail.

3 Find the inverse Z-transform of the $X(z) = \dfrac{z}{(z-0.75)(z-0.5)^2}$

4 Calculate the convolution of $x(n) = \underset{\uparrow}{[3,4,7,6,5]}$ and $h(n) = \underset{\uparrow}{[1,5,7,8,2]}$

5 Discuss the design of an IIR filter by impulse invariant method by considering suitable example.

6 Determine the direct form-l and direct form -II structure for the systems described by the system function

$$H(z) = \frac{1-0.8z^{-1}+0.15z^{-2}}{1+0.1z^{-1}-0.7z^{-2}}$$

SECTION-C

7 Compute the 8-point DFT of $x(n) = 2n + 1$; $0 \le n \le 7$ using Decimation in time FFT algorithm.

8 Obtain the coefficients of a FIR filter to meet the specifications given below using the window method.

Stopband attenuation	> 40 dB
Transition width	0.5 kHz
Sampling frequency	8 kHz
Ideal cutoff frequency	1.5 kHz

9 Explain in detail the architecture of ADSP processor with the help of neat sketch.