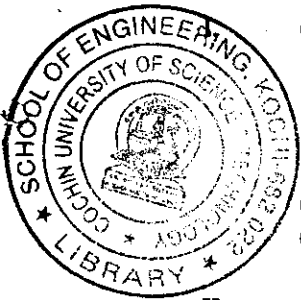


**B.Tech. Degree VII Semester (Supplementary) Examination in
Electronics and Communication Engineering
March 2003**

**EC 703 DIGITAL SIGNAL PROCESSING
(1998 Admissions)**

Time: 3 Hours

Maximum Marks: 100



- (a) Perform the convolution of the given sequences by computing the Z transform:
- $$x_1(n) = \left(\frac{1}{2}\right)^n u(n) \quad (8)$$
- $$x_2(n) = \left(\frac{1}{4}\right)^n u(n)$$
- (b) Derive the condition for BIBO stability of an LTI system. (6)
- (c) Show that $\delta(n) = u(n) - u(n-1)$. (6)
- OR**
- II. Determine the response $y(n)$ and impulse response $h(n)$ of a system described by the difference equation $y(n] - 3y(n-1) - 4y(n-2) = x(n) + 2x(n-1)$ for $n \geq 0$ where $x(n) = (-1)^n u(n)$.
I.C.s are $y(-1) = y(-2) = 0$ (20)
- III. (a) Explain the DIT FFT by deriving the necessary equations. Show the flow graph. (10)
- (b) Using the DIT FFT structure, compute the DFT of the sequence $\{1, 0, 0, 1\}$. (10)
- OR**
- IV. Compute the linear convolution of the following two sequences by using the DIT FFT structure.
 $x_1(n) = \{1, 3, 3, 1\}$ $x_2(n) = \{1, 0, 1\}$ (20)
- V. (a) Derive the expression for DCT - 1. (6)
- (b) What are the applications of DCT? (6)
- (c) What is short term Fourier Transform? (8)
- OR**
- VI. (a) Explain multiresolution analysis of wavelet transforms. (8)
- (b) Prove that the 2D convolution of two linearly separable 2D sequences is also linearly separable. (12)
- VII. (a) Explain any one method of design of an IIR digital filter. (10)
- (b) What is windowing? Explain the different window functions used in FIR filter design. (10)
- OR**
- VIII. (a) Explain the Fourier series method of design of FIR filters. (10)
- (b) Describe the impulse invariant technique of IIR filter design. (10)
- IX. Explain the architecture of any TMS 320 CXX processor with the necessary block diagram. (20)
- OR**
- X. (a) What are the important features of DSP processors? Explain. (10)
- (b) What are the addressing modes used in a TMS 320 processor? (10)