Code No. BTS 069(C)

B.Tech. Degree VII Semester (Supplementary) Examination in Electronics and Communication Engineering, October 2000

EC 701 DIGITAL SIGNAL PROCESSING

Time: 3 Hours *Max. Marks: 100*

I a) Distinguish between the following with examples
(i) Time variant and time invariant systems.
(ii) Causal system and anticausal system (10)

b) Determine the Z-transform of the following
(i) $\delta(n-1)$
(ii) $\left(\frac{1}{2}\right)^n U(n)$ (10)

OR

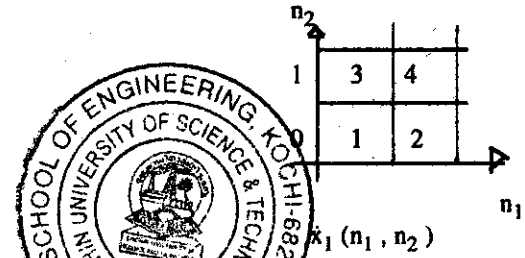
II a) Explain how the prediction of the output of a system can be done given its impulse response. Also explain how the impulse response can be used to predict the stability of the system. (12)

b) Determine whether or not the given system is stable, causal, linear and shift invariant.

$$T[X(n)] = \sum_{k=n_o}^{n} X(k) \quad (8)$$

III a) Explain the aliasing effect in time domain due to sampling in frequency domain (10)

b) Find the convolution of $x_1(n_1, n_2)$ and $x_2(n_1, n_2)$ (10)



(P.T.O)

OR

IV a) Define causality and separability with reference to 2 - D systems. (10)

b) Find the inverse discrete Fourier transform of the sequence $X(k) = \{ 6, -2 - j2, 2, -2 + j2 \}$ (10)

V a) Explain FFT algorithm for an 8 - point sequence using decimation in time. (10)

b) What do you mean by 'in place' computation in FFT algorithm ? What is its significance ? (10)

OR

VI a) Compare the computational complexities of DFT and FFT. (10)

b) Compute the FFT of the following sequence
$X(n) = \{ 1, 1, -1, -1, 1, 1, -1, -1 \}$ (10)

VII a) Realize the following filter in the direct form and parallel form

$$H(z) = \frac{1 + \frac{1}{2} z^{-1}}{\left(1 - z^{-1} + \frac{1}{4} z^{-2}\right)\left(1 - z^{-1} + \frac{1}{2} z^{-2}\right)}$$ (10)

b) Under what circumstances, we select Direct form, Parallel form and Cascade form in the realization of IR digital filters. (10)

OR

VIII Write detailed notes on:
(i) FIR filter
(ii) IIR filter (20)

Contd...3

IX a) Explain the features of the digital signal processing chip TMS 320. (10)

b) Discuss the various applications of digital signal processing. (10)

OR

X Explain in detail, the effect of finite word length in digital filter implementation. (20)

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