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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
 (AUTONOMOUS)
M.Tech I Year II Semester (R16) Regular Examinations May/June 2017
ADVANCED DIGITAL SIGNAL PROCESSING
 (CONTROL SYSTEMS)
 (For Students admitted in 2016 only)

Time: 3 hours

Max. Marks:60

(Answer all Five Units 5 X 12 =60 Marks)

UNIT-I

- 1 a. Find the DFT of the following sequence $x(n) = [1 -1 0 -2 1 1 0 -2]$ using DIF FFT. 7M
 b. With neat diagrams explain about sample and hold circuits. 5M

OR

- 2 a. Broadly explain the properties of Discrete Fourier Transform. 8M
 b. Define DFT and IDFT and explain clearly about practical implementation of them in time/frequency transformation. Hence bring out the computational complexity in their implementation. 4M

UNIT-II

- 3 a. Find convolution of $x(n) = \{1, 2, 2, 3, 1\}$ and $h(n) = \{1, 2, 3\}$. 6M
 b. Explain any six properties of Z-transform. 6M

OR

- 4 a. Determine z - transform, pole - zero locations and sketch the ROC of following signal $x(n) = -u(-n-1) + (1/2)^n u(n)$. 7M
 b. Find the inverse z - transform of $X(z) = (2+z^{-1})/(1-0.5z^{-1})$ with ROC $|z| > 1/2$ using power series expansion. 5M

UNIT-III

- 5 a. Discuss the realization of FIR filter structures. 4M
 b. Consider the system $y(n] = y(n - 1) + 2y(n - 2) + x(n)$
 i) Find $H(z)$
 ii) Realize using direct form-II 8M

OR

- 6 a. Explain briefly about different structures in IIR systems. 8M
 b. Realize system with following difference equation in direct form-I
 $y(n] = (3/4) y(n-1) - (1/8) y(n-2) + x(n] + (1/3)x(n-1)$ 4M

UNIT-IV

- 7 a. Draw the magnitude spectrum, phase spectrum of the following windows and also write their time domain representation
i) Hamming window ii) Triangular window iii) Blackman window 9M
b. Explain the design procedure of Butterworth approximation. 3M

OR

- 8 a. Convert the following analog filter transfer function using backward difference method, Impulse invariant method and Bilinear Transformation method. $H(s)=1/(s+0.2)$,Consider $T= 1$ Sec. 8M
b. What are the Preliminary conditions to be consider for designing IIR filters. 4M

UNIT-V

- 9 a. Illustrate the process of quantization of fixed point and floating point numbers in the analysis of finite word length effects. 7M
b. Explain the effect of input scaling on signal to noise ratio (SNR). 5M

OR

- 10 a. Explain clearly type-1 and type-2 Polyphase Decomposition. 7M
b. Discuss about fast DFT algorithm based on index mapping. 5M

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