Q.P. Code: **16EC3802** **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
M.Tech I Year I Semester (R16) Regular Examinations January 2017
ADVANCE DIGITAL SIGNAL PROCESSING
(DECS)
(For Students admitted in 2016 only)

Time: **3 hours** Max. Marks: **60**

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

UNIT-I

Q.1 a Explain the classification of LTI discrete time systems with examples 6M

b Define DFT and IDFT. State properties of DFT 6M

OR

Q.2 a Explain the energy spectrum of a discrete time sequence 6M

b Check whether the following systems are LTI or not:
(i). Y(n)=2x(n+2)-x(n-2) (ii) $Y(n)=n^2x(2n)$ 6M

UNIT-II

Q.3 a Write a brief notes on lattice structures. Mention the advantages of lattice structures 6M

b Develop a minimum-multiplier realization of a length-9 type 3 FIR transfer function. 6M

OR

Q.4 a Realize the 4th order FIR transfer function using power - symmetric FIR cascaded lattice structure

$$H_4(z) = 1 + 0.2Z^{-1} + 0.3Z^{-2} + 0.376Z^{-3} + 0.06Z^{-4} + 0.2Z^{-5}$$ 7M

b Explain the Gray-Markel method of realization of IIR transfer function 5M

UNIT-III

Q.5 a What do you understand by the term Polyphase structures for sample rate conversion 5M

b The bandwidth of a sequence x(n) is 3.4 KHz and it sampling rate is to be reduced, by decimation from 240 KHz to 8KHz. Assume that an Optimal FIR filter is to be used, with an overall pass band ripple 0.05 and stop band ripple 0.01.Design an efficient Two Stage Decimator. 7M

OR

Q.6 a Explain the time domain and frequency domain analysis of sampling rate conversion by a factor I/D 6M

b Perform the two-band poly-phase decomposition of the transfer function

$$H(z) = \frac{2 + z^{-2}}{1 + 0.75z^{-2}}$$ 6M

UNIT-IV

Q.7	a	Compare parametric and non-parametric Estimation of Power spectrum using ARMA model	6M
	b	Discuss in brief about Burg Method and List out the Advantages and Disadvantages of it	6M
		OR	
Q.8	a	Discuss in brief about Welch method of Power Spectrum Estimation	6M
	b	Derive the relation between Auto-Correlation and Model parameters of ARMA and from that derive for AR and MA models	6M

UNIT-V

Q.9	a	Explain Spectral analysis of non-sinusoidal signals.	6M
	b	Explain some of the special audio effects that are implemented in digital for musical sound processing	6M
		OR	
Q.10	a	Explain clearly about quantization in ADC and the effect of it on data length. Relate length to noise power spectral density	6M
	b	Explain the methods to represent number for digital computation	6M

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