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

Question Paper Code: 31404

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Electrical and Electronics Engineering

01UEC624 - APPLIED DIGITAL SIGNAL PROCESSING

(Common to Electronics and Instrumentation Engineering and Instrumentation and Control Engineering)

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. List out the applications of digital signal processing.
2. Define energy and Power signal?
3. Define system function.
4. Define discrete Fourier series.
5. What do mean by the term “bit reversal” as applied to FFT?
6. What is twiddle factor?
7. Compare Hamming window and Kaiser Window.
8. Distinguish between FIR filters and IIR filters.
9. What is the principle feature of Harvard architecture?
10. Define pipelining.

PART - B (5 x 16 = 80 Marks)

11. (a) Explain the process of reconstruction of the signal from its samples with expression. (16)

Or

(b) (i) Write short notes on classification of signals. (8)

(ii) State and prove the sampling theorem for strictly band limited signals of finite energy. (8)

12. (a) Apply Z-Transform and show that *u[n]*u(n-1)= n u(n)* and hence find the inverse z transform of $X|z| = \frac{1-\frac{1}{3}z^{-1}}{(1-z^{-1})(1+2z^{-1})}$. (16)

Or

(b) (i) Perform the Circular convolution of two sequences: $x_1(n) = \{2, 1, 2, 1\}$ $x_2(n) = \{1, 2, 3, 4\}$. (8)

(ii) Determine the impulse response *h(n)* for the system described by the second order difference equation, *y(n)-4 y(n-1 +4 y(n-2) =x(n-1).* (8)

13. (a) Compute the eight-point DFT of the sequence$x(n) = \{n + 1\}$, Using the radix-2 decimation-in-time algorithm. (16)

Or

(b) Determine the 8-point DFT of the sequence *x(n) = {2, 2, 2, 2, 1, 1, 1, 1}* using radix-2 DIF-FFT algorithm. (16)

14. (a) Design a low pass filter using rectangular window by taking 9 samples of *W(n)* and with a cutoff frequency of 1.2 *rad /sec*. (16)

Or

(b) Design an ideal low pass filter with a frequency response

$$H_d(e^{j\omega}) = \begin{cases} e^{-j3\omega}, \frac{-\pi}{4} \le \omega \le \frac{\pi}{4} \\ 0 \quad , \frac{\pi}{4} < |\omega| \le \pi \end{cases},$$

Find the values of *h(n)* using hanning window and determine the transfer function H(z). (16)

15. (a) Explain the architecture of TMS320C50 with a neat diagram. (16)

Or

(b) Explain the various addressing modes in TMS320C54 processor with one example for each. (16)

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