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

Question Paper Code: 36424

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Sixth Semester

Electrical and Electronics Engineering

01UEC624 - APPLIED DIGITAL SIGNAL PROCESSING

(Common to EIE and ICE)

(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. Compare deterministic and random signals.
3. State Sampling Theorem.
4. Summarize three methods of doing inverse Z-transform.
5. Determine the spectra of the signals, $x_p(n) = \{1,1,0,0\}$ with period N=4.
6. What is twiddle factor?
7. Compare Hamming window and Hanning Window.
8. Distinguish between FIR filters and IIR filters.
9. Illustrate the block diagram of Modified Harvard architecture.
10. Mention various stages in 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) State and prove the sampling theorem for strictly band limited signals of finite energy. (16)

12. (a) Discover the general solution of the difference equation $y(n) = x(n) - 3y(n-1)$ with initial condition $y(-1) = 0$ and input $x(n) = n^2 + n$. (16)

Or

(b) 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).* (16)

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) Calculate the DFT of the following sequence x(n) using the DIT-FFT algorithm. x(n)={1, -1, -1, -1, 1, 1, 1, -1}. (16)

14. (a) Design a single pole low pass digital IIR filter with -3dB bandwidth of 0.2π, by use of bilinear transformation. (16)

Or

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

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

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) Write a simple assembly language program and discuss the complete operation step by step. (16)

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