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

Question Paper Code: 36424

B.E. / B.Tech. DEGREE EXAMINATION, NOV 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. Is the system $y(t)=y(t-1)+2t\,y\,(t-2)$ time invariant?
2. Define energy and Power signal.
3. State Sampling Theorem.
4. Define system function.
5. What do mean by the term “bit reversal” as applied to FFT?
6. What is twiddle factor?
7. Compare Hamming window and Hanning Window.
8. What is prewarping?
9. What is the principle feature of Harvard architecture?
10. Define pipelining.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Draw the block diagram of a typical DSP system. Discuss. (8)

(ii) Determine whether the given system is time invariant system

(1) $(n) = x(n) - x(n-1)$ (2) $y(n) = n\,x(n)$ (8)

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 output sequence *y(n)* if *x(n)={1, 2, 3, 2}* and *h(n)={1, 2, 2}* using linear convolution graphical method. (16)

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

Or

(b) Calculate the DFT of the following sequence x(n) using the DIT-FFT algorithm. x(n)={0, 0, 0, 0, 1, 1, 1, -1}. (16)

14. (a) (i) Apply Impulse invariant method for the analog transfer function

$H(s) = \frac{10}{s^2+7s+10}, T = 0.2\ sec$ (8)

(ii) Apply bilinear transformation method for the given analog transfer function

$(s) = \frac{2}{(s+1)(s+2)}$, where T=1 sec. (8)

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) Describe in detail the architectural aspects of TMS320C54 digital signal processor using an illustrative block diagram. (16)

Or

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