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

Question Paper Code: 96421

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Sixth Semester

Electronics and Electrical Engineering

19UEC621– Digital Signal Processing for Electrical Engineers

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. $y(n) = x(n-2) + x(2-n)$ is CO1- App

   (a) Causal (b) Time variant (c) Non Causal (d) All of the mentioned

2. The ROC of a causal signal is the _____ of a circle of same radius r. CO1- U

   (a) interior (b) exterior (c) both a and b (b) none of these

3. Find the DFT of y(n)={1,1,0,0} CO3- App

   (a) y(n)= {-2,3-3i,0,3+3i} (b) y(n) = {2,1+i,0,1-i }

   (c) y(n)={2,1- i,0,1+i} (d) y(n) = {-2,3+3i,0,3-3i }

4. A direct partial-fraction expansion of the transfer function in Z leads to CO4- U

   (a) The parallel form II structure (b) The parallel form I structure

   (c) Cascaded structure (d) None of the above

5. In TMS 320 C6x processor architecture, which functional unit is adopted for transferring the data from register to and from control register? CO5- U

   (a) L2 (b) M2 (c) S2 (d) D2

PART – B (5 x 3= 15 Marks)

6. A discrete-time signal x(n) is defined as CO1- App

   $x(n) = \{1+ n/3 , -3 \leq n \leq -1$

   $1, 0 \leq n \leq 3$ and 0, elsewhere

   Draw x(n) and its inverse.

7. Convolve of the following using z-Transform CO2- App
$X(z) = 1 + 2z^{-1} + z^{-2}$ and $H(z) = 1 + z^{-1} + z^{-2}$

8. Compare DFT and DTFT. CO3- U

9. Define Gibbs Phenomenon. CO4- U

10. Define pipelining. CO5- U

PART – C (5 x 16= 80 Marks)

11. (a) With neat sketch explain the classification of signals**.** CO1- U (16)

Or

(b) Determine the following systems are linear, stability and time invariance of the system. CO1- App (16)

(i) y[n]=x[2n]

(ii) y[n]=sin x[n]

12. (a) Compute the following Z[sin(nπ/2)] and Z[-5^n u(n)]. CO2- App (16)

Or

(b) Find $Z^{-1}[(3z^2) / (z^2 + 7z + 10)]$. Using convolution method. CO2- App (16)

13. (a) By means of the DFT and IDFT, determine the response at the FIR filter with the impulse response h(n) = [1,2,3] and the input sequence x(n) = [1,2,2,1]. CO3- App (16)

Or

(b) Find X(k) using radix-2 DIT-FFT algorithm, when x(n) = {2,1,2,1,2,1,2,1} CO3- App (16)

14. (a) Design a linear phase FIR Low pass filter using hamming window with cut off $\omega_c = 0.8\pi$ rad/sample by taking N=7 samples. CO4- App (16)

Or

(b) Design a butterworth digital IIR filter using Bilinear Transform by taking T= 1 sec to satisfy the following specification CO4- App (16)

$0.6 \leq |H(w)| \leq 1$ for $0 \leq w \leq 0.35\pi$

$|H(w)| \leq 0.1$ for $0.7\pi \leq w \leq \pi$

15. (a) Describe the function of on chip peripherals of TMS 320 C54 processor. CO5- U (16)

Or

(b) What are the different buses of TMS 320 C54 processor? Give their functions. CO5- U (16)