Q.P. Code: 16EC422

R16

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech III Year II Semester Supplementary Examinations Dec 2019
DIGITAL SIGNAL PROCESSING
(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

1 a When the Convolution and Correlation of two discrete time signals are equal? Explain. **4M**

b Determine the Linear Convolution and Correlation for the two sequences x(n)={3,2,1,2},h(n)= {1,2,1,2}. **8M**

OR

2 a How do you find the natural & forced response of LTI System? Explain with examples. **4M**

b Determine response of LTI System whose impulse response h(n) = {1,2,1} to the input x(n) = {1,2,3} using DFT method. **8M**

UNIT-II

3 a How the periodic and symmetry properties of DFT help to reduce the complex multiplications and additions in FFT? Explain. **4M**

b Formulate the DFT by divide and conquer approach. **8M**

OR

4 a Compute IDFT of the sequence X(K)= { 7, -0.707-j0.707, -j,   0.707-j0.707, 1, 0.707+j0.707, j, -0.707+j0.707} using Radix-2 DIT FFT Algorithm. **10M**

b Name the applications FFT Algorithm. **2M**

UNIT-III

5 a FIR filter is all zero and IIR filter is pole – zero system. Explain. **4M**

b Consider the system $y(n) = y(n - 1) + 2y(n - 2) + x(n)+3x(n-1)$ (i) Find H(z) (ii) Realize using Cascade and Parallel form. **8M**

OR

6 a The lattice form constants K_1=1/2, K_2=1/3, and K_3= 2/3. Determine the direct form constants and draw the realization structure. **6M**

b Find the lattice form structure for the following difference equation $y(n) = x(n)-1/2 \ y(n-1) -1/3 \ y(n-2) – ¾ \ y(n-3)$. **6M**

UNIT-IV

7 a Derive the relation between analog & digital frequency using BLT Method and Discuss pole transformation between S-Plane & Z-plane. **6M**

b Obtain the transfer function of Butterworth HPF for order N=3. **6M**

OR

8 a Design a Chebyshev filter for the following specifications using Bilinear transformation
$0.8 \le |H(e_{jw})| \le 1 \ \ 0 \le w \le 0.2\pi$
$|H(e_{jw})| \le 0.2 \ \ 0.6\pi \le w \le \pi$ **7M**

b Compare FIR and IIR filters. **5M**

<div align="center">UNIT-V</div>

9 a What is linear Phase? Deduce the condition for linear phase in FIR filter. **5M**

   b Design a filter with $H_d(e^{j\omega}) = e_{-j3\omega}$; $-\pi/4 \leq \omega \leq \pi/4$ **7M**
      $\qquad\qquad\qquad = 0;\qquad \pi/4 \leq \omega \leq \pi$

   Using Hamming window with N = 5.

<div align="center">**OR**</div>

10 a Discuss the spectral characteristics of rectangular window. **7M**

   b Discuss the design a linear phase FIR filter using frequency sampling method. **5M**

<div align="center">*** END ***</div>