R16

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech IV Year I Semester Regular & Supplementary Examinations Feb-2021
DIGITAL SIGNAL PROCESSING
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 60

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

UNIT-I

1 a Explain the classification of discrete time signals and systems.   5M
   b Determine the circular convolution for the two sequences $x_1(n)=\{1,2,3,2\}$, $x_2(n)=\{1,3,1,5\}$ using concentric circles method.   7M

OR

2 State and prove following properties of DFT   12M
   i) Circular shifting   ii) Time reversal   iii) Complex conjugate   iv) Linearity
   v) Circular convolution.

UNIT-II

3 How do you compute DFT using   12M
   i) The Goertzel Algorithm   ii) The chrip-z Transform.

OR

4 a Explain decimation in frequency FFT algorithm.   6M
   b Compare radix-2 DIT-FFT and DIF-FFT algorithms.   6M

UNIT-III

5 Determine the direct form I , direct form-II ,cascade and parallel form realization for   12M
   the system $y(n)= -0.1y(n-1)+0.2y(n-2)+3x(n)+3.6x(n-1)+0.6x(n-2)$.

OR

6 a Discuss the realization of FIR filter structures.   6M
   b Determine the cascade form realization for the following FIR filter with system   6M
      function $H(z) = 1 + (5/2) z^{-1}+2z^{-2}+2z^{-3}$.

UNIT-IV

7 a Discuss about Low pass to high pass transformation in analog domain.   6M
   b Design a high pass filter for the given specifications $\alpha_p=3dB$; $\alpha_s=15dB$; $\Omega p=1000rad/s$ 6M
      $\Omega s=500rad/sec$.

OR

8 Design a digital Butterworth filter satisfying the constraints   12M
   $0.707\le |H(e^{j\omega})|\le1$ for $0 \le \omega \le \pi/2$
          $|H(e^{j\omega})|\le0.2$ for $3\pi/4 \le \omega\le \pi$ with T=1 sec using
   i) The bilinear Transformation ii) Impulse invariance method.

UNIT-V

9 Design an ideal band pass filter with a frequency response   12M
   $$H_d(e^{jw}) =1 \quad \pi/4 \le|w|\le3\pi/4$$
   $$= 0 \text{ otherwise}$$
   Find the values of h(n) for N=11 and plot frequency response.

OR

10 a Discuss about characteristics linear phase FIR filters.   6M
    b Compare features of different windowing functions.   6M

*** END ***