CODE: 17CD02107

M. Tech I Year I Semester Regular Examinations, February 2018

ADVANCED DIGITAL SIGNAL PROCESSING
(PE & D)

Time : 3 hours Max Marks : 60

Answer all **five** units. (5 x 12 = 60 Marks)

UNIT-I

1. (a) With a neat block diagram explain the successive approximation A/D converter. Briefly discuss the characteristics of a practical A/D converter.

(b) State and explain frequency shifting and convolution property of DTFT.

OR

2. Consider the sequence x1(n) = {1,2,0,1} and x2(n)= {1,3,3,1}. Evaluate circular convolution using DIT-FFT method.

UNIT-II

3. (a) Explain the linear phase structures of FIR filters and parallel form I structure of IIR filters.

(b) Explain the properties of ROC.

OR

4. (a) Find the Z transform of the following signal x(n) where x(n) is the convolution of x1(n) and x2(n). Given x1(n) = 〖(1/2)〗^n u(n) and x2(n) = 〖(1/3)〗^n u(n)

(b) Explain any two structures each for realizing FIR and IIR digital filters.

UNIT-III

5. Design a digital low pass IIR (Butterworth Approximation) filter with maximally flat magnitude characteristics. The pass band edge frequency ωp is 0.25л, with a pass band ripple not exceeding 0.5dB. The minimum stop band attenuation at the stop band edge frequency ωs of 0.55л is 15dB. Use bilinear transformation. Explain the design wherever required.

OR

6. Design a digital high pass IIR (Chebyshev Approximation) filter with pass band edge frequency Fp is 700Hz, stop band edge FS = 500Hz, pass band ripple 1dB, minimum stop band attenuation 32 Db and sampling frequency 2kHz. The minimum stop band attenuation at the stop band edge frequency ωs of 0.55л is 15dB. Use bilinear transformation. Explain the design wherever required.

Continued in page 2

CODE: 17CD02107

UNIT-IV

7. (a) Design a low pass FIR filter for the desired specification given as follows: pass band edge ωp=0.3 л, stop band edge ωs=0.5 л and minimum stop band attenuation αs=40dB. Use Kaiser window. Given N=23, M=11.

(b) Explain any two window functions used in FIR filter design.

OR

8. (a) Explain Parks-McClellan algorithm.

(b) Compare the various design techniques of FIR filters.

UNIT-V

9. (a) Explain the reduction of product round-off noise using first order and second order error feedback structure.

(b) Explain multi rate structures in brief for sampling rate conversion.

OR

10. (a) Explain any one interpolation algorithm used in arbitrary rate sampling rate converter.

(b) Briefly explain the quantization process and errors.

*****