

Electronics and Communication Engineering

Fifth semester

EC9304 Digital Signal processing

(REGULATION 2008)

Time: 3 Hour

Max. Mark:100

Answer ALL Questions

Part-A(10X 2 =20 Marks)

1. What do the coefficients of DFT represent for?.
2. What is the need for overlap-add & overlap-save method?
3. What are the specifications of a BPF?
4. What is the pole location of digital IIR filter?
5. What is special feature of an FIR filter?
6. Why do you apply window function?
7. Differentiate between truncation error and rounding error.
8. Why do you use DS processor?
9. Is multirate system a linear invariant system?
10. What are the factors to be considered for multirate signal processing?

PART-B (5 X 16 = Marks)

- 11 i) Determine the FFT coefficients using DIF for the sequence $x(n) = \{1,1,1,1,1,1,1,1\}$ (8)
- 11 ii) Find the linear convolution of $x(n) = \{1,2,3,4,5,6,7,8\}$ and $h(n) = \{1,2,1\}$ using overlap-save method. (8)
- 12 a i) Derive the model order of a LPF using Butterworth polynomial. (8)
- ii) Realize the TF $H(z) = (0.7 - 0.252z^{-2}) / (1 + 0.1z^{-1} - 0.72z^{-2})$ using parallel structure. (8)

(OR)

12 b i) Prove that the bilinear transform method converts stable analog filter into always stable digital filter. (12)

ii) How do you convert analog LPF to analog LPF, HPF, BSF, BPF? (4)

13 a i) Explain in detail with an example the design of 7th order HP FIR filter using Hamming window (16)

(OR)

b i) Draw the lattice structure of FIR filter $y(n)=2x(n)+0.8x(n-1)+1.5x(n-2)+.667x(n-3)$ (12)

ii) Draw the structure of FIR. (4)

14 a i) Discuss the quantization noise power due to truncation and rounding. (6)

ii) Explain limit cycle oscillation due to overflow. (10)

(OR)

b i) Draw a general DSP architecture of TMS 320C5xxx/TMS 320C6xxx and explain its operation. (16)

15 a i) Explain decimation operation with an example. (8)

ii) How do you implement decimation using polyphase decomposition? Explain. (8)

(OR)

b i) Explain interpolation operation with an example. (8)

ii) How do you implement interpolation using polyphase decomposition. Explain. (8)