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

Question Paper Code: 36401

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

Sixth Semester

Electronics and Communication Engineering

01UEC601 - DIGITAL SIGNAL PROCESSING

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Differentiate DTFT and DFT.
2. Why Fast Fourier transform is needed?
3. Compare direct form I and direct form II realizations of IIR system.
4. Sketch the mapping of s-plane to Z-plane in bilinear transformation.
5. What are the advantages and disadvantages of FIR filters?
6. Define Gibb's phenomenon.
7. What is truncation?
8. What is meant by overflow limit cycle?
9. Give the advantages of multi-rate signal processing.
10. Define interpolation and decimation.

PART - B (5 x 16 = 80 Marks)

11. (a) Compute the Eight point DFT of the sequence
x(n) = {0.5,0.5,0.5,0.5,0,0,0,0}
using the in-place radix-2 DIT FFT algorithm. (16)

Or

(b) Perform circular convolution for the sequence $x_1(n)=\{1, 1, 2, 1\}$ and $x_2(n)=\{1, 2, 3, 4\}$ using DFT and IDFT. Justify the result by computing in time domain. (16)

12. (a) Design a digital Low Pass filter using Butterworth approximation using bilinear transformation to meet the following specifications.

Pass band edge is 120*Hz*

Stop band edge is 170*Hz*

Stop band attenuation is 16*dB*

Assume sampling frequency is 512*Hz*. (16)

Or

(b) For the analog transfer function $H(s) = \frac{2}{s^2+3s+2}$. Determine *H(z)*using impulse invariant transformation. Assume *T*=1 second. (16)

13. (a) Design a Low Pass Filter with 11 coefficients for the following Specifications: pass frequency edge is 0.25*kHz* and sampling frequency is 1*kHz* using hanning window. (16)

Or

(b) Explain in detail about frequency sampling method of designing an FIR filter. (16)

14. (a) Explain the fixed and floating point representation of numbers in Digital systems. (16)

Or

(b) Describe the different addressing modes of TMS320C5X with examples. (16)

15. (a) Discuss the sub band coding of speech signal with a suitable example. (16)

Or

(b) Derive an expression for the spectrum of output signal of a decimator. (16)

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