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

Question Paper Code : 50965

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

Fourth/Fifth Semester

Computer and Communication Engineering

EC 3492 — DIGITAL SIGNAL PROCESSING

(Common to : Electronics and Communication Engineering/Electronics and Telecommunication Engineering and Medical Electronics)

(Regulations 2021)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. State sampling theorem.

2. What is meant by bit reversal and in place computation as applied to FFT?

3. What are the requirements for converting a stable analog filter into a stable digital filter?

4. By Impulse Invariant method, obtain the digital filter transfer function and differential equation of the analog filter $H(s) = 1/(s+1)$.

5. What are the advantages of FIR filters?

6. What is the condition for linear phase of a digital filter?

7. What are the errors that arise due to truncation in floating point numbers?

8. What do you mean by limit cycle oscillations in digital filter?

9. Define multi sampling rate.

10. What is the use of adaptive filters?

PART B — (5 × 13 = 65 marks)

11. (a) Draw radix 4 butterfly structure for (DIT) FFT algorithm.

Or

(b) Two finite duration sequence are given by $x(n) = \sin(n\pi/2)$ for $n = 0,1,2,3$ $h(n) = 2n$ for $n = 0,1,2,3$. Determine circular convolution using DFT & IDFT method.

12. (a) Distinguish between FIR and IIR filters.

Or

(b) Discuss the properties of Butterworth filter and Chebyshev filter.

13. (a) Discuss in detail about FIR filter design using windows.

Or

(b) Explain Finite word length effects in FIR filters.

14. (a) Give the effective of quantization noise in signal processing and also mention input/output quantization.

Or

(b) Write in detail about Finite word length effects.

15. (a) Discuss the sampling rate conversion by rational factor.

Or

(b) Explain in detail about DSP architecture.

PART C — (1 × 15 = 15 marks)

16. (a) Draw and explain FIR filter structure.

Or

(b) Explain Direct form structures for IIR systems.

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