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GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR

(GIET UNIVERSITY)

Ph.D. (Second Semester-Summer) Examinations, May – 2025

23SPPEEC2012– VLSI Signal Processing

(ECE)

Time: 3 hrs Maximum: 70 Marks

The figures in the right hand margin indicate marks.

	Answer *ANY FIVE* Questions. (14 x 5 = 70 Marks)	**Marks**
1.a.	Explain the concept of numerical strength reduction in Digital Signal Processing (DSP) and describe how it improves computational efficiency.	8
b.	Define pipelining in DSP and explain how it enhances processing speed.	6
2.a	Explain how pipelined processing can be utilized in a real-time DSP system for audio processing.	7
b.	Explain the concept of iteration bound in a DSP system and discuss its impact on the system's performance.	
3.a.	Define the concept of retiming and describe how it can be applied to optimize a Digital Signal Processing system.	7
b.	Explain the concept of unfolding in DSP and provide an example where unfolding enhances performance.	7
4.a	Define algorithmic strength reduction and discuss its significance in filter design and signal transformations.	7
b.	Explain the concept of systolic architecture and its application in Digital Signal Processing systems.	7
5.a.	Define bit-level arithmetic in DSP systems and explain its impact on the performance of digital filters.	7
b.	Discuss the significance of redundant arithmetic in the design of Digital Signal Processing hardware.	7
6.a.	Differentiate between synchronous, wave, and asynchronous pipelining techniques in Digital Signal Processing systems.	7
b.	Explain the different techniques used in designing low-power Digital Signal Processing systems.	7
7.a	Compare and contrast various hardware architectures used in digital signal processing for the implementation of lattice filters.	8
b.	Define fast convolution and explain its importance and applications in digital signal processing.	6
8.a.	Define Programmable Digital Signal Processors and discuss their significance in real-time digital signal processing applications.	7
b.	What is a Digital Signal Processing system, and in what ways does it differ from conventional signal processing systems?	7

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