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

Question Paper Code : 82444

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Elective

VLSI Design

VL 9253/10244 VLE 61 — VLSI SIGNAL PROCESSING

(Common to M.E. Applied Electronics)

(Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the common DSP algorithms and their applications?

2. What is the concept of vector quantization?

3. What are the advantages and applications of Re-timing?

4. What is the significance of algorithmic strength reduction?

5. State Lagrange interpolation theorem.

6. Mention the three forms of pipeline interleaving.

7. State Horner's rule.

8. What is the concept of scaling?

9. Define clock skew.

10. What are the properties of wave pipelined implementation?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Draw the block diagram of MPEG-2 encoder and explain it in detail. (8)

(ii) Explain the design steps of a parallel FIR system with an example. (8)

Or

(b) (i) Discuss the concept of Fine-grain pipelining with a neat diagram. (8)

(ii) Explain the draw backs of pipelining in detail. (8)

12. (a) (i) State and prove the properties of retiming. (8)

(ii) Derive a 16 point DCT architecture using algorithm-architecture transformation. (8)

Or

(b) (i) Explain the properties of unfolding in detail. (8)

(ii) Design a parallel rank order filter for window size W = 7 and block size L = 6. Calculate the number of C and S units. (8)

13. (a) (i) Explain the features of fast convolution with an example. (8)

(ii) Construct a 4 × 4 linear convolution algorithm using 2 × 2 short convolution. (8)

Or

(b) (i) Explain the concept of clustered look-ahead pipelining. (8)

(ii) Explain the features of Cook-Toom algorithm and modified Cook-Toom algorithm with examples. (8)

14. (a) (i) Derive the basic lattice filters using reserve Schur polynomials and also explain the steps. (8)

(ii) What is VMA? Explain its implementation as a 4 × 4 carry-save array with a neat diagram. (8)

Or

(b) (i) Explain the applications of CSD number representation with an example. (8)

(ii) Give an account on "Round – off noise in pipelined IIR filters. (8)

15. (a) (i) Compare and contrast Bundled data protocol and Dual rail protocol. (8)

(ii) Apply sub expression elimination to the polynomial :

$x^{22} + x^{19} + x^{14} + x^7 + x$. Determine the number of multiplication required to evaluate the polynomial both before and after sub expression is applied. (8)

Or

(b) (i) Draw the circuit diagram of a normally transparent asynchronous transition latch and explain its operation. (8)

(ii) Write technical notes on "Two-phase clocking". (8)
