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

Question Paper Code : 64265

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Elective

VLSI Design

VL 7012 — MIXED SIGNAL IC TEST AND MEASUREMENTS

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define a mixed signal circuit. List any four mixed signal circuits.
2. Write the process of testing a typical mixed signal circuit.
3. What is the purpose of leakage testing?
4. How DC transfer characteristics are measured?
5. What is the role of a general purpose multimeter in DC measurements?
6. What is the need of arbitrary waveform generator in testing an AC circuit.
7. What is Parseval's theorem.
8. Define Blackman window.
9. What are the advantages of DFT?
10. Write a note on scan chain and its usage in testing.

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the various testing equipment required to test a semiconductor devices? Explain them in detail. (8)

(ii) Explain the role of E-beam tester probes and Focused tester probes are used in testing. (8)

Or

(b) What is the role of testing in pre-silicon production, post-silicon production and during volume production? Explain various challenges that are faced in each stage.

12. (a) (i) Explain with a neat circuit, differential output offset test setup. (6)

(ii) Using a circuit, explain the principle and various aspects involved in testing a voltage regulator. (6)

(iii) Distinguish between line regulation and load regulation. (4)

Or

(b) (i) Explain testing and measurement process required to measure input impedance, output impedance and differential impedance. (12)

(ii) Explain the problems encountered in measuring open-loop gain. How the problems are solved to measure open-loop gain? (4)

13. (a) (i) With a neat diagram, explain working of pin card electronics. (12)

(ii) Explain with a neat diagram, functionality and requirement of relay matrices. (4)

Or

(b) (i) Why Kelvin connections are used to connect high-current DC power supplies to the DUT? (5)

(ii) Why are the number of vectors in the frame loop and the frequency of the digital vectors in a sampling frame important when developing a digital pattern for a mixed-signal test? (5)

(iii) What is the purpose of source memory? (3)

(iv) What is the purpose of capture memory? (3)

14. (a) Explain in detail, how inverse FFT is useful in testing?

Or

(b) (i) Find the trigonometric Fourier series representation of a square-wave $x(t)$ having a period of 2 S and whose behavior is described by eqn. (1) $x(t) = \begin{cases} +1 & if\ 0 < t < 1 \\ -1 & if\ 1 < t < 2 \end{cases}$. (6)

(ii) Calculate the DTFS representation of the 10-kHz clock signal in 14(b)(i) problem when sampled at a 100-kHZ sampling rate. (10)

15. (a) (i) What are the advantages gained due to partitioning in testing? (6)

(ii) Explain full scan and partial scan in detail. (10)

Or

(b) What is BIST and why it is required in testing? Explain various aspects of Digital BIST.
