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

Question Paper Code : 11921

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Elective

VLSI Design

VL 9256/VL 956/10244 VLE 32 — VLSI TECHNOLOGY

(Regulation 2009/2010)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the defects present in a crystal structure?
2. List down the properties of thin oxides.
3. What are the advantages of proximity printing?
4. What is Sputtering?
5. How is the thickness of a deposited thin-film measured?
6. What are the desired properties metalization for integrated circuits?
7. Give the importance of string algorithm in etching process.
8. What do you mean by twin-tub process? Draw a CMOS structure using twin-tub process.
9. Is it possible to identify a specimen using beam-specimen interaction? How?
10. What bonding pad pitch is required to place 244 I/Os on a pad limited VLSI chip that is 6mm square?

PART B — (5 × 16 = 80 marks)

11. (a) Explain the Czochralski technique of crystal growth. (16)

Or

(b) (i) Discuss the process of Molecular beam epitaxy in detail. (8)

(ii) List the impurities that damage the oxidation rate and explain the effect of impurities on the oxidation. (8)

12. (a) (i) Describe a simple electron beam lithography system. (8)

(ii) With explanation, show how anisotropic etching allows faithful reproduction of resist patterns into the films that make up a device. (8)

Or

(b) (i) What are the advantages of dry etching over wet etching? Explain any one dry etch technique. (8)

(ii) Will optical exposure be sufficient for nano-scale lithography or should electron or x-ray, system be used. Explain with reasons. (8)

13. (a) (i) With a neat diagram, explain Plasma-Deposition reactors. (10)

(ii) Derive Fick's one-dimensional Diffusion equations. (6)

Or

(b) (i) Describe ion implantation with a schematic diagram of the ion implantation machine. (10)

(ii) How can multilevel metallization schemes reduce interconnection resistance? Explain. (6)

14. (a) Discuss on MOS memory IC technology used for static and dynamic RAM. (16)

Or

(b) Explain optical projection lithography and its simulation process with neat diagrams. (16)

15. (a) Explain with flow diagram the generic assembly sequence for plastic and ceramic packages. (16)

Or

(b) Write notes on the following :

(i) Via hole etching and filling. (8)

(ii) Thermal design consideration in packaging. (8)