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

Question Paper Code: 52171

M.E. DEGREE EXAMINATION, MAY 2016

First Semester

VLSI Design

15PVL101 - VLSI TECHNOLOGY

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

(5 x 20 = 100 Marks)

1. (a) (i) Discuss the silicon crystals preparation followed by most of the semiconductor industry. (10)

(ii) Differentiate chemical and non-chemical vapour deposition epitaxial process and evaluate the epitaxial slices, layer doping and thickness. (10)

Or

(b) (i) Examine the oxidation model and its fit to experimental data. Also describe the effect of orientation, dopant concentration, addition of HCL to the ambient, and surface damage on the kinetics of oxidation. (12)

(ii) Discuss the oxidation induced stacking faults and oxide isolation defect. (8)

2. (a) (i) Why electron lithography offers higher resolution than optical lithography? Describe the X-RAY Lithography and its significance compared to other lithography. (12)

(ii) Define plasma along with basic parameters to describe plasma properties. (8)

Or

(b) (i) Discuss the feature-size control and anisotropic etch mechanism. (10)

(ii) Investigate the plasma-etching techniques in IC fabrication process suitable for any applications. (10)

3. (a) (i) Discuss the deposition method to provide films at low sample temperatures. (8)

(ii) Describe the fick's one-dimensional diffusion equations to solve the diffusion problem without considering the mechanism of the atomic movements in the silicon crystal. (12)

Or

(b) (i) Study a few measurement techniques for determining diffusivities in diffusion. (8)

(ii) Detail the formation of a deposit on a substrate away from the source using physical vapour deposition. (12)

4. (a) (i) Determine the methods widely used to simulate ion implantation phenomena in solids. (8)

(ii) Illustrate the lithography to create the very small features and patterns that make up an IC. Also describe the steps of etching and deposition process in any modern silicon technology. (12)

Or

(b) (i) Explain the Twin-tub CMOS structure at several stages of the process. (10)

(ii) Identify the technology for high speed applications and describe the fabrication process sequence and special process considerations that is crucial to be addressed. (10)

5. (a) (i) Discuss the interaction of various analytical beams using non chemical techniques which had particular impact on the development of VLSI technology. (12)

(ii) What is the significance of chemical methods? Illustrate the methods of analytical chemistry to the use of complex instrumentation. (8)

Or

(b) (i) List the design consideration methods and its significance in packaging. (8)

(ii) Elucidate the basic assembly operations currently in use for VLSI devices. (12)

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