

Roll No.

MEVD-201

M. Tech. (Second Semester)
EXAMINATION, August, 2008
(Micro Electronics & VLSI Design)

VLSI TECHNOLOGY

(MEVD-201)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks. Assume any missing data.

1. How a single crystal silicon is grown ? Explain with suitable diagram the Czochralski technique for GaAs crystal growth.
2. How the SiO_2 is grown ? What are its uses ? Explain the thermal oxidation mechanism and explain any one method with suitable diagram.
3. Prove that the oxidation of the silicon surface results in an oxide layer which is about 2.27 times the thickness of the consumed silicon.

A slice of (100) silicon has small phosphorus-doped islands, each of with a surface concentration of $6 \times 10^{20} \text{ CM}^{-3}$. The slice is given a 60-min wet oxidation at 900°C . Calculate the thickness of the oxide over doped and undoped regions respectively.

4. What is Diffusion ? What are the different mechanism by which the random jumps of an impurity in a lattice takes place ? Describe each one of them.
5. What is ion-implantation ? Describe any *one* technique in detail.
6. Describe the principle of basic photoresist chemistry. Describe X-ray lithography.
7. What is chemical vapor deposition (CVD) ? Describe in detail.
Write a short note on VPE (Vapour-phase epitaxy).
8. Write short notes on any *two* of the following :
 - (i) Comparison of positive and negative photoresist
 - (ii) Deal Grove model for oxidation
 - (iii) Molecular Beam Epitaxy (MBE)
 - (iv) Plasma-enhanced CVD
 - (v) Photo-masking process