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Roll No

MEVD-201**M.E./M.Tech. II Semester**

Examination, December 2015

VLSI Technology**Time : Three Hours****Maximum Marks : 70**

- Note:** i) Attempt any one question from each unit.
ii) All questions carry equal marks.

Unit - I

1. Draw schematic diagram of the production of Electronic-Grade Silicon (EGS) from the hydrogen reduction of trichlorosilane and describe in details.

OR

2. A silicon wafer having an oxygen content of 6.5×10^{17} atoms/cm³ is processed at 1000°C for a time sufficient to precipitate all excess oxygen. Upon removal from the furnace, the wafer has a center to edge temperature difference of 5°C. Will dislocations result?

Unit - II

3. Write all the effects of impurities and Damage on the oxidation Rate. Explain each of them in details.

OR

4. Write a note on any two of the following :
 - a) Oxidation techniques
 - b) Oxide properties
 - c) Oxidation of polysilicon

Unit - III

5. Describe the X-ray Lithography in details and what are the commercially available X-ray step-repeat exposure systems.

OR

6. Explain any two of the following :
 - a) Electron beam exposure system
 - b) Photo-masking process
 - c) Basic photo resist chemistry

Unit - IV

7. Derive the equation for Fick's Second Law of diffusion and explain Fick's One-Dimensional Diffusion Equations.

OR

8. A p-type <100> oriented silicon wafer with a substrate doping of 10^{16} atoms/cm³ has been implanted and diffused with arsenic to an ion dose of 1×10^{15} cm⁻² at 30 KeV and diffusion at 850°C for 20 min in nitrogen.
 - a) Calculate the sheet resistance.
 - b) Calculate the surface concentrations.
 - c) Find the surface concentration of the electrically active arsenic.
 - d) Discuss the results.

Unit - V

9. Write a short note on any two of the following :
 - a) Chemical Vapor Deposition (CVD)
 - b) Plasma-Enhanced CVD (PECVD)
 - c) Molecular Beam Epitaxy (MBE)
 - d) Metallization
