Major Test

SEMICONDUCTOR DEVICE TECHNOLOGY: PHL704

II Semester 2006-07

Max. Marks 40 Time : 2 Hr

Attempt all questions.

1a. Show that the rate of oxidation of silicon follows mixed linear- parabolic relationship. Also indicate the limiting conditions under which the equation reduces to linear or parabolic cases.. 6

b. How do water, sodium and chlorine affect the oxidation rate of silicon? 3

2. Aluminium and its alloy are used extensively for metallization in integrated circuits. What are the problems faced during shallow junction metallization on Silicon? Explain them and how are these problems minimized? 6

3 Explain the steps involved in mechanisms of wet chemical etching in silicon technology. Discuss the silicon etching by wet chemical etchants. 3+3

4a. Explain the diffusion mechanisms in silicon lattice and discuss the conditions under which these mechanisms dominate. 6

b. Show the nature of diffusion profile of P for various surface concentrations after diffusion into silicon for 1hr at 1000C and explain the profile. 4

5a. Discuss in brief the mechanisms of ion stopping in silicon and the factors on which they depend. 6

b. Why do we need annealing after ion implantation? 3

OR

b. How does channeling affects the profile in the case of Boron, P, and As ion implanted at different energies?