Printed Pages : 4 **NEC-603**

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 131613 **Roll No.** ☐☐☐☐☐☐☐☐☐☐

B. TECH.

Theory Examination (Semester-VI) 2015-16

INTEGRATED CIRCUIT TECHNOLOGY

Time : 3 Hours ***Max. Marks : 100***

Section-A

Q1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10=20)

(a) List the basic process for IC fabrication.

(b) Explain the purpose of oxidation.

(c) Compare proximity printing and projection printing.

(d) What are plasma deposition reactors? Why and how these are used?

(e) What are the widely used materials for film deposition.

(f) Explain photomask and photoresist.

P.T.O.

Q **Attempt any five questions from this section. (10×5=50)**

(a) (i) What is Fick's law of diffusion? Boron is diffused into an n-type single crystal substrate with doping conc. of 10^{15} atm/cm^3. Assume diffusion function to be Gaussian, if diffusion time is 1hr, surface conc.$=1\times10^{18}$/cm^3 and depth of junction is 2μm, determine diffusivity.

(ii) Explain ion implantation and mention its advantages over diffusion.

(b) Why oxidation is done? Explain the chemistry and kinetics of growth using Deal Groves Model.

(c) (i) What is latch up? How latch up is avoided in CMOS technology?

(ii) Describe "Dopant Profiles" in brief.

measurement.

(f) Explain molecular beam epitaxy in detail. What are its advantages over VPE?

(g) What are the effects of nesting tolerance on MOSFET layout? Discuss and describe with the help of suitable diagrams.

(h) Discuss and describe the various process design considerations of VLSI devices.

Section-C

Attempt any two questions. (2×15=30)

Q3. (a) What do you mean by Sputtering? Explain Sputtering Yield. Draw the schematic diagram of signal parallel-plate sputtering system and its working.

(b) Explain why [illegible] is needed for the deposition of refractory materials like tantalum.

Q4. (a) Discuss diffusion. Find diffusion constants for :

(i) Interstitial diffusion

(ii) Substitutional diffusion

(b) Give reasons and explain why NPN transistors are preferred over PNP counterparts

Q5. Write short notes on following :

(a) MOS IC fabrication technique

(b) Czochralski Process

(c) CVD process