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Total No. of Questions : 08

M.Tech.(VLSI D) (2016 & Onwards) EL-III (Sem.–3)

PROCESS AND DEVICE CHARACTERIZATION & MEASUREMENTS

Subject Code : MTVL-307

M.Code : 74816

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carry equal marks.**

1. a) Explain differential hall effect and spreading resistance resistivity profiling.

   b) Write short notes on the free carrier absorption and electron beam induced current.

2. a) Compare the following :

   (i) Positive photo resist and negative photo resist.

   (ii) Schokly and Ohmic contacts.

   b) Explain the working principle of Fourier transform infrared spectroscopy.

3. a) Describe the Hayness-Schokly experiment for the measurement of drift mobility of n-type semiconductor.

   b) Discuss the working of scanning electron microscope used for critical dimension measurement.

4. a) What is LOCOS? Why it is required in CMOS process? Explain technology solution for avoiding problems in LOCOS.

   b) Define Range, Projected Range and Straggle with respect to ion implantation. Also explain the damage produced due to light and heavy ion with neat diagram.

5. a) Write short notes on the impurity profiling.

   b) What is SOI technology? Enlist method of fabrication of SOI. Explain any one of them.

6. a) Describe the experimental setup for the four probe method for resistivity measurement and hot probe test for conductivity measurement with the help of a neat diagram.

   b) How the charge-voltage characteristic of a capacitor can be evaluated in circuit simulator?

7. a) What is Hall effect? Enlist important electrical parameters for which measurement is required before device processing begins. Explain the procedure for measuring Hall mobility.

   b) Discuss various Silicon crystal defects. Also explain parametric test and functional test for IC testing.

8. Write short notes on the following :

   a) Interstitial and Substitutional diffusion process

   b) Czochralski method

   c) Multigate devices

   d) SIMOX method for fabrication of SOI.

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.