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Paper Code: EEC-034	Roll No.										

B.Tech.
(SEM VIII) Back Paper EXAMINATION 2015-16
INTEGRATED CIRCUIT TECHNOLOGY

[Time: 3 hrs.] **[Max. Marks: 100]**

Note- Attempt All Questions. All Questions carry equal marks.

Q.1. *Attempt any **TWO** parts of the following.* **10x2=20**

(a) What do you mean by scale of integration? What are the factors that have led to the evolution of VLSI? Explain.

(b) Enlist the various shaping operations in order to obtain prepared silicon wafer and explain any one of them in detail

(c) Define epitaxial layer. Describe the epitaxial growth process and process control. What are the advantages of epitaxial growth process in IC fabrication?

Q.2. *Attempt any **TWO** parts of the following.* **10x2=20**

(a) What are the requirements of an oxide used for a diffusion masks? Explain the kinetics of oxide growth.

(b) What is photo mask? How many masks are required to complete an integrated circuit? Name them and list the function performed by each mask.

(c) A silicon wafer is covered with a 100 nm thick layer of silicon dioxide. What is the added time required to double the thickness of the oxide in dry oxygen at 1200 ^{0} C? Given that the linear and parabolic rate constants for dry oxidation of silicon are 1.125 micrometer per hour and 0.045 micrometer square per hour respectively at 1200 ^{0}C.

Q.3. *Attempt any **TWO** parts of the following.* **10x2=20**

(a) Derive the diffusion equation. What are the factors which affect the diffusion process? Explain

(b) Define sheet resistance. How will you measure it? Explain.
Calculate sheet resistance of a one mil thick silicon wafer which has been doped uniformly with phosphorus to a concentration of 1.5×10^{16} per Cm^3 and antimony to a concentration of 2×10^{15} per cm^3 .

(c) What is the projected range in an ion implantation technique? How will you obtain a uniform impurity doping profile with this technique? Explain.

Q.4. *Attempt any **TWO** parts of the following.* **10x2=20**

(a) Define thin films. What are the desired properties of the metallization for Integrated circuit fabrication? Briefly describe the advantages and disadvantages of APCVD technique for thin film deposition.

(b) Describe the various types of thin film deposition technique for the deposition of Aluminum film. What are the variables for deposition? Explain.

(c) What are the different types of packages for integrated circuits? Describe any one in detail.

Q.5. *Attempt any **TWO** parts of the following.* **10x2=20**

(a) What are the different methods for CMOS fabrication? Explain any one of them in detail.

(b) What is the need of isolation in monolithic integrated circuits? Explain how will you obtain isolation between components in a monolithic I. C.? How do you eliminate the parasitic capacitances due to p-n junction isolation?

(c) What is the purpose of buried layer? How is it fabricated? What impurity is commonly used for it? Give the reasons.