

B.TECH
(SEM V) THEORY EXAMINATION 2022-23
VLSI TECHNOLOGY

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections. If require any missing data; then choose suitably.**SECTION A**

- 1. Attempt all questions in brief. 2 x 10 = 20**
- a. What does Moore's law state?
 - b. List two major defect that appear in crystal structure.
 - c. What is Epitaxy?
 - d. What is auto doping?
 - e. What are PR materials?
 - f. Name photo masking technique commonly used.
 - g. What is diffusion furnace importance?
 - h. What type of gaseous source commonly used in diffusion?
 - i. What is sputtering?
 - j. What is ohmic contact in VLSI?

SECTION B

- 2. Attempt any three of the following: 10 x 3 = 30**
- a. With diagram explain the CZ process for crystal growth.
 - b. Explain about Molecular beam epitaxial process with block diagram.
 - c. Briefly explain Electron Beam Lithography? List its importance.
 - d. Explain the Ion implantation technique in IC fabrication with neat diagram.
 - e. Explain how packaging can be achieved in VLSI for IC.

SECTION C

- 3. Attempt any one part of the following: 10 x 1 = 10**
- a. Explain importance of wafer cleaning technology? Explain its type?
 - b. Explain various processing consideration while design an IC?
- 4. Attempt any one part of the following: 10 x 1 = 10**
- a. Explain with a diagram Vapor Phase Epitaxy?
 - b. Calculate the oxidation time required for the thermal oxidation of 100 Å and 5000 Å thickness at 1000 °C. Note $B = 5.2 \times 10^5 \text{ Å}^2/\text{min}$ and $B/A = 111 \text{ Å}/\text{min}$.
- 5. Attempt any one part of the following: 10 x 1 = 10**
- a. List all process steps of pattern transfer with diagram.
 - b. What are the requirements of a photoresist? Which photoresist is preferred for better resolution and why?
- 6. Attempt any one part of the following: 10 x 1 = 10**
- a. Derive the diffusion equation. How the depth of diffusion is controlled during diffusion process? Give the solution of Fick's Law?
 - b. How the impurity concentration and junction depth are independently controlled in an ion implantation process.
- 7. Attempt any one part of the following: 10 x 1 = 10**
- a. Explain the metallization and describe the problems associated with this process. Explain dc sputtering method of metallization?
 - b. Explain CMOS fabrication steps in detail?