

**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  $B/A = 111 \text{ Å/min}$ .

**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?