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 A and 5000 A thickness at 1000 ^{0}C. Note B = 5.2×10^5 A^2/min and B/A = 111 A/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?