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Paper Id: 231997 Sub Code: KEC-053

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

Time: 3 Hours

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

SECTION A

1. Attempt all questions in brief.

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

SECTION B

2. Attempt any three of the following:

- With diagram explain the CZ process for crystal growth. a.
- Explain about Molecular beam epitaxial process with block diagram. b.
- Briefly explain Electron Beam Lithography? List its importance. c.
- Explain the Ion implantation technique in IC fabrication with neat diagram. d.
- Explain how packaging can be achieved in VLSI for IC. e.

SECTION C

3. Attempt any one part of the following:

- Explain importance of wafer cleaning technology? Explain its type? a.
- Explain various processing consideration while design an IC? b.

Attempt any one part of the following: 4.

- Explain with a diagram Vapor Phase Epitaxy? a.
- b. Calculate the oxidation time required for the thermal oxidation of 100 A and 5000 A thickness at 1000 °C. Note $B = 5.2 \times 10^5 \text{ A}^2/\text{min}$ and B/A = 111 A/min.

5. Attempt any one part of the following:

- List all process steps of pattern transfer with diagram. a.
- What are the requirements of a photoresist? Which photoresist is preferred for better b. resolution and why?

6. Attempt any *one* part of the following:

- Derive the diffusion equation. How the depth of diffusion is controlled during a. diffusion process? Give the solution of Fick's Law?
- How the impurity concentration and junction depth are independently controlled in b. an ion implantation process.

7. Attempt any one part of the following:

- Explain the metallization and describe the problems associated with this process. a. Explain dc sputtering method of metallization?
- Explain CMOS fabrication steps in detail? b.

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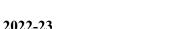
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Roll No.



Total Marks: 100

 $2 \times 10 = 20$