PAPER ID-311567

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM V) THEORY EXAMINATION 2025-26
VLSI TECHNOLOGY

TIME: 3 HRS **M.MARKS: 70**

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 07 = 14**

Q no.	Question	CO	Level
a.	Define Moore law.	1	K1
b.	Name two chemicals commonly used in wet cleaning.	1	K1
c.	State any two advantages of molecular beam epitaxy.	2	K2
d.	What is a photomask.	3	K1
e.	Mention two disadvantage of wet etching.	3	K2
f.	State Fick's second law of diffusion.	4	K2
g.	Write an advantage of sputtering over evaporation in metallization.	5	K2

SECTION B

2. Attempt any *three* of the following: **07 x 3 = 07**

a.	Describe dry cleaning techniques for silicon wafers, highlighting the differences from wet cleaning methods.	1	K2
b.	Explain the process of Silicon on Insulator formation using the SIMOX technique.	2	K2
c.	Discuss the working principle of electron beam lithography with a proper diagram.	3	K3
d.	Explain the principle of ion implantation and its advantages over conventional diffusion techniques.	4	K2
e.	Explain CMOS fabrication steps in detail?	5	K2

SECTION C

3. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Explain the Czochralski (CZ) crystal growth process. Discuss its importance in producing electronic-grade silicon for IC fabrication.	1	K3
b.	Describe a complete workflow starting from silicon crystal growth to a cleaned wafer ready for IC fabrication	1	K2

4. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Explain the principle of Vapor-Phase Epitaxy (VPE) and discuss its advantages and limitations.	2	K2
b.	Describe Deal-Grove model of oxidation in detail.	2	K3

5. Attempt any *one* part of the following: **07 x 1 = 07**

a.	What are the requirements of a photoresist? Which photoresist is preferred for better resolution and why?	3	K2
b.	Describe the deposition process of polysilicon films**. Compare** low-pressure CVD (LPCVD) and plasma-enhanced CVD (PECVD) methods.	3	K3

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6. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Derive the diffusion equation. How the depth of diffusion is controlled during diffusion process?	4	K3
b.	Compare solid, liquid, and gaseous sources for impurity diffusion in silicon.	4	K3

7. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Explain the need for packaging in VLSI devices. How does packaging affect the performance and reliability of ICs?	5	K2
b.	Write a short note on: 1. Package Fabrication Technologies 2. Sputtering	5	K2