



Roll No:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

BTECH
(SEM V) THEORY EXAMINATION 2024-25
VLSI TECHNOLOGY

TIME: 3 HRS

M.MARKS: 100

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

SECTION A

1. Attempt all questions in brief.

2 x 10 = 20

Q no.	Question	CO	Level
a.	Define SSI, MSI, LSI, and VLSI in the context of integrated circuits.	1	K1,K2
b.	What is the purpose of wafer cleaning in IC fabrication?	1	K1,K2
c.	What is vapor-phase epitaxy, and where is it used?	2	K1,K2
d.	Define the term "oxidation kinetics" in silicon processing.	2	K1,K2
e.	What is the primary purpose of photo masks in lithography?	3	K1,K2
f.	Name two materials used in dielectric film deposition.	3	K1,K2
g.	State Fick's first law of diffusion.	4	K1,K2
h.	What is ion-implantation, and why is it used in silicon processing?	4	K1,K2
i.	What is the purpose of metallization in IC fabrication?	5	K1,K2
j.	Name two common types of VLSI packaging.	5	K1,K2

SECTION B

2. Attempt any three of the following:

10 x 3 = 30

a.	Explain the process of Czochralski crystal growth and its significance in IC fabrication.	1	K1,K2
b.	Explain the process of molecular beam epitaxy (MBE) and compare it with vapor-phase epitaxy (VPE).	2	K1,K2
c.	Describe the deposition processes for polysilicon, silicon dioxide, and silicon nitride films.	3	K1,K2
d.	Derive Fick's 1-dimensional diffusion equation and explain its application in IC fabrication.	4	K1,K2
e.	Describe the process of vacuum deposition and sputtering used in metallization.	5	K1,K2

SECTION C

3. Attempt any one part of the following:

10 x 1 = 10

a.	Discuss the different methods of wafer cleaning (wet and dry) and their advantages.	1	K1,K2
b.	Describe the steps involved in wafer preparation from electronic-grade silicon.	1	K1,K2

4. Attempt any one part of the following:

10 x 1 = 10

a.	Discuss the properties of thin oxide films and the techniques used for their growth.	2	K1,K2
b.	Describe the role of silicon-on-insulator (SOI) technology in VLSI fabrication.	2	K1,K2



PAPER ID-310969

Roll No:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

BTECH
(SEM V) THEORY EXAMINATION 2024-25
VLSI TECHNOLOGY

TIME: 3 HRS

M.MARKS: 100

5. Attempt any one part of the following: 10 x 1 = 10

a.	Explain the process of optical lithography and its significance in IC manufacturing.	3	K1,K2
b.	Compare electron beam lithography with optical lithography in terms of resolution and applications.	3	K1,K2

6. Attempt any one part of the following: 10 x 1 = 10

a.	Discuss the equipment and techniques used for ion-implantation in VLSI manufacturing.	4	K1,K2
b.	Explain the diffusion profiles of impurities in silicon and the role of gaseous, liquid, and solid sources.	4	K1,K2

7. Attempt any one part of the following: 10 x 1 = 10

a.	Discuss the design considerations and fabrication technologies for VLSI packaging.	5	K1,K2
b.	Explain the CMOS fabrication steps in detail, highlighting the role of metallization and packaging.	5	K1,K2

QP25DP1_143 | 25-Jan-2025 9:14:15 AM | 182.71.247.82