

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)



M.Tech. (Second Semester - Regular) Examinations, May – 2026

24MECP12002/24MVLPE12002– IC Technology

Time: 3 hrs

Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Describe the various techniques of epitaxy used in semiconductor manufacturing.	CO1	K3
b. Discuss device isolation techniques: junction, oxide, and trench isolation.	CO2	K2
c. What are the components of packaging in semiconductor devices, and what is electronics package reliability?	CO3	K1
d. Explain minority carrier lifetime and diffusion length in semiconductor materials.	CO4	K2
e. What are the features of PD SOI and FD SOI device structures?	CO5	K1

PART – B

(10 x 5 = 50 Marks)

Answer **ALL** the questions

	Marks	CO #	Blooms Level
2. a. Discuss the significance of crystal orientation and lattice matching in substrate preparation.	5	CO1	K3
b. Explain lithography steps, including photoresist application, patterning, and mask making.	5	CO1	K2
(OR)			
c. Detail CMOS process flows: N-well, P-well, and Twin-tub methods.	5	CO1	K3
d. Explain the importance of cleanroom classification and contamination control in IC fabrication..	5	CO1	K3
3.a. Explore contact types (Ohmic and Schottky) and their significance in semiconductor fabrication.	5	CO2	K4
b. Discuss advancements in GaAs technologies: MESFET, MMIC, and optoelectronic devices.	5	CO2	K2
(OR)			
c. Evaluate BiCMOS technology advantages and performance over CMOS and bipolar technologies.	5	CO2	K3
d. Compare PD SOI and FD SOI structures highlighting features and use-cases.	5	CO2	K4
4.a. Analyze technology trends in VLSI design and fabrication with respect to scaling and reliability.	5	CO3	K3
b. Describe ion beam and plasma etching techniques and their application in advanced semiconductor devices.	5	CO3	K2
(OR)			
c. Explain the deposition methods: evaporation, sputtering, and chemical vapor deposition, their advantages and applications.	5	CO3	K3
d. Compare epitaxial layers formed through MBE, VPE, and LPE techniques.	5	CO3	K3

5.a.	Describe rapid thermal processing (RTP) and its benefits in controlling thermal budgets.	5	CO4	K2
b.	Explain oxidation in device fabrication and differentiate between dry and wet oxidation.	5	CO4	K3
(OR)				
c.	Explain the role of metallization in IC fabrication and discuss the requirements of a good interconnect material.	5	CO4	K1
d.	Describe electromigration in metal interconnects and explain its effect on IC reliability.	5	CO4	K2
6.a.	Describe the relevance of Hall effect measurements in semiconductor characterization.	5	CO5	K2
b.	Explain thermal and electrical design considerations in semiconductor packaging.	5	CO5	K3
(OR)				
c.	Outline silicon bipolar technologies: second-order effects, BJT performance, and BiCMOS.	5	CO5	K3
d.	Explain conductivity type and resistivity measurements in substrate quality assessment.	5	CO5	K2

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