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GIET UNIVERSITY, GUNUPUR – 765022

Ph.D. (Second Semester) Examinations, April – 2024

PPEEC2022 - IC Technology

(ECE)

Time: 3 hrs

Maximum: 70 Marks

The figures in the right-hand margin indicate marks.

Answer ANY FIVE Questions

(14 x 5 = 70 Marks)

	Marks
1. Explain the phase diagram and solid solubility in semiconductor substrates. How do crystal defects affect the performance of semiconductor devices?	14
2. Explain the process of silicon oxidation in IC fabrication. Discuss the kinetics of growth, properties of silicon dioxide, and the importance of high-k and low-k dielectrics.	14
3. Discuss the nature of diffusion in semiconductor materials. How is diffusion used to introduce impurities into semiconductor substrates?	14
4. Describe the different etching techniques employed in semiconductor processing. How do wet chemical etching, dry physical etching, and reactive ion etching differ?	14
5. What are the key features and advantages of silicon bipolar technologies? Discuss second-order effects in bipolar transistors and the performance of BiCMOS technology.	14
6. Explain the fabrication of SOI (Silicon-on-Insulator) technology using different methods such as SIMOX and Smart Cut. What are the advantages of SOI technology?	14
7. Discuss the different epitaxy techniques used in semiconductor manufacturing. How are molecular beam epitaxy, vapour phase epitaxy, and liquid phase epitaxy evaluated for quality?	14
8. What are the key considerations in ion implantation in semiconductor processing? Discuss penetration range, process considerations, and the effects of implantation damage.	14

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