

**B.Tech Even Semester Examination, May, 2025****Electronics & Communication Engineering**

(4th Semester)

**Course No: ECC-407***(Microelectronics Technology)**Full Marks: 70**Pass Marks: 28**Time: 3 hours***Note:**

1. Attempt any five questions taking one from each unit.
2. Begin each answer in a new page
3. Answer parts of a question at a place
4. Assume reasonable data wherever required
5. The figure in the right margin indicates full marks for the question
6. All the mathematical symbols and abbreviations have their usual meanings.

**UNIT-I**

1. Why semiconductors are so important materials for making integrated circuits? What are classifications of ICs? Write the advantages and limitations of ICs. Discuss the process technology trends over the last few decades according to Moore's law. 2+2+4+6=14
2. Explain the Silicon float-zone process with a neat diagram. Discuss the wafer shaping processes. Explain the Bridgman crystal growth technique with a neat diagram. 6+4+4=14

**UNIT-II**

3. What is epitaxial layer? Explain the physical vapor deposition (PVD) technique with a neat diagram. Which sources are used for CVD of GaAs? Explain

**Turn Over**

the molecular beam epitaxy (MBE) technique with suitable diagram.  $2+5+2+5=14$

4. What are importance of oxidation in the process of integrated circuit manufacturing? What are the different oxidation techniques - explain? Discuss the kinetics of oxide growth mechanisms.  $2+6+6=14$

### UNIT-III

5. Define a class 10 clean room and its equivalent in metric system. Discuss the optical lithography with suitable diagrams. Explain the different exposure techniques used in photolithography? What are the resolution enhancement techniques?  $2+6+4+2=14$
6. Explain wet chemical etching in details. Discuss the sputter etching process with a neat diagram. Explain reactive ion etching technique.  $6+4+4=14$

### UNIT-IV

7. Discuss the diffusion mechanism used in IC fabrication process. Draw the diffusion profile in Si and explain. Derive Fick's law of diffusion.  $5+6+3=14$
8. Discuss the ion distribution of an ion implantation system. Explain the ion channeling, implant damages and their remedies. Draw the schematic of an ion implanter neatly and explain.  $3+6+5=14$

### UNIT-V

9. What the metallization processes used in VLSI circuits? Discuss the Cu metallization process. Discuss vacuum evaporation and sputtering.  $2+6+6=14$

10. What is meant by IC packaging? Draw the structure of different IC packages. What are package design considerations?  $4+6+4=14$

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