Roll No. _____ Total Pages : 2

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5th Sem. Electronics

BT-5/D08

MICROELECTRONICS

PAPER - ECE-3Q9E

Time : 3 Hrs. Maximum Marks : 100

Note : Attempt any five questions in all, selecting at least one question from each unit. All questions carry equal marks.

UNIT-I

1. Explain all the factors that are to be taken into account in order to grow a single crystal of doped silicon by Czochralshi technique which is relatively free from point defect, stress, dislocations and with uniform dopant distribution vertically and radially and with a predecided crystal orientation.

2. With a schematic diagram, explain with Molecular Beam Epitaxy growth chamber and the growth process. What are the requirements for good quality epitaxial films ?

UNIT-II

3. What are the major requirements that a resist must satify to be useful for submicron technology ? Explain e-Beam lithograpy technique for pattern writing.

4. Explain the anisotropy in plasma etch process and the resulting profile. Explain the effects of plasma parameter, like excitation frequency and pressure on etch rate.

UNIT-III

5. Explain interstitial and substitutional diffusion mechanisms. Why the activation energy for diffusion is higher for substitutional diffusion ? Describe the phosphorus diffusion system for emitter diffusion of a biopolar transistor.

6. Explain the ion stopping mechanism in ion-implantation. Briefly explain the models used for estimating the depth distribution of implanted ions. Explain how annealing repairs the lattice damage and make dopants electrically active.

UNIT-IV

7. Explain the heat-transfer model to evaluate the junction-to-ambient thermal resistance of a packaged die. Describe the tailess ball and wedge bonding cycle of wire bonding.

8. Describe the following process steps for fabricating ideal NMOS IC :

   a. Choice of Starting material
   b. Isolation,
   c. Channel doping,
   d. Gate material, and
   e. Source/Drain formation