BIELE-002

B.TECH. IN ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

00041

Term-End Examination

December, 2013

BIELE-002 : MICROELECTRONICS TECHNOLOGY

Time : 3 hours   *Maximum Marks : 70*

Note : (i) Attempt *any seven* questions.

(ii) Assume suitable missing data, if *any*.

1. (a) How n-type and p-type wafers are identified using flats ? Explain using diagrams.   **2x5=10**
   (b) Explain the types of defects in a crystal structure.

2. (a) How EGS is prepared from MGS ? Explain with suitable diagrams.   **2x5=10**
   (b) Explain the process of crystal growth using CZ technique.

3. Explain the kinetics of oxidation using Deal and Grove's model.   **10**

4. What is Lithography ? Name different types of Lithography process available. Explain any one process with suitable example.   **10**

5. What is the use of Etching process in VLSI fabrication ? Name different types of Etching process. Explain the process of Reactive Ion-Beam Etching using suitable diagram.   **10**

6. (a) Derive Fick's Laws of diffusion equations.

   (b) Assume that Boron is diffused into an n-type Si Single Crystal substrate with a doping concentration of 10^{15} atoms/cm^3, and also that the diffusion profile can be described by a Gaussian function. Using a diffusion time of 60mins, one obtains a measured junction depth of $2\mu m$ and a surface concentration of $1 \times 10^{18} cm^{-3}$. Find the diffusivity from this impurity profile. **2x5=10**

7. Explain the process of ion-implantation with suitable schematic diagram. Describe the advantages and disadvantages of high energy implantation. **10**

8. Enlist the desired properties of metallization for integrated circuits. What are the applications of metallization ? What are the problems in metallization ? **10**

9. What is the need of Epitaxy in IC fabrication ? Discuss the MBE growth system using its schematic diagram. **10**

10. Write short notes on **any two** of the followings :
    (a) CMOS IC technology **2x5=10**
    (b) Bipolar IC technology
    (c) SOI technology