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BIELE-002

B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

00376

June, 2016

BIELE-002 : MICROELECTRONICS TECHNOLOGY

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Assume suitable missing data, if any. Use of scientific calculator is permitted.*

1. Explain the Czochralski Crystal Growing theory. What are the subsystems used in this crystal growth mechanism ? *10*

2. (a) What is silicon shaping ?

(b) How do you evaluate the characteristics of single crystal silicon ? Explain. *5+5*

3. Explain the basic transport processes and reaction kinetics of vapour phase epitaxy. Draw and discuss the three common reactors used for epitaxial growth process. *10*

4. (a) Discuss the oxidation process using silicon oxidation model.

(b) Explain the properties of oxide layer grown by dry oxidation and wet oxidation methods. *5+5*

5. (a) Explain the lithography process by taking a suitable example.

(b) Differentiate between optical lithography and electron beam lithography processes. *5+5*

6. (a) Describe the plasma properties used in Reactive Plasma Etching. How is plasma created ?

(b) What is the difference between isotropic and anisotropic etching ? Explain with a suitable diagram. *5+5*

7. (a) Discuss the various schemes of deposition process of dielectric and polysilicon. Explain with a suitable diagram.

(b) Differentiate between the properties of SiO_2, Si_3N_4 and polysilicon. *5+5*

8. (a) Discuss the diffusion process in solids using a neat diagram.

(b) Derive Fick's laws of diffusion equations.

(c) Find the relation between concentration dependent diffusivities and temperature dependence of the diffusivities. *3+4+3*

9. Describe the ion-implantation method by drawing its schematic diagram and explain ion stopping, dose, channelling and range distribution. *10*

10. Write short notes on any ***two*** of the following : *2×5=10*

(a) Physical Vapour Deposition

(b) Chemical Vapour Deposition

(c) Multi Level Metallization