SBG Study : Download Free Study Material
WWW.SBGSTUDY.COM

TEC-503 118 Printed Pages : 4

Paper Code & Roll No. to be filled in your Answer Book

Roll No.

Odd Semester Examination-2016

B.Tech. (Semester-V)

VLSI TECHNOLOGY

[Time : 3 Hours] [Maximum Marks :100]

Note : Attempt **all** questions.

1. Attempt **any four** questions : [5×4=20]

   (a) What is IC's? Describe the types of IC's?

   (b) What is single crystal growth? Describe one of the approaches that allow the crystal to be grown.

   (c) Compare dry and wet oxidation techniques of oxidation process.

   (d) Describe the preparation method for metallurgical grade silicon (MGS) and also compare MGS with EGS.

SBG Study : Download Free Study Material
WWW.SBGSTUDY.COM

(e) Explain the diffusion controlled case and reaction controlled case with help of Deal Grove's Model.

(f) Calculate the oxidation time required for the thermal oxidation of 100Å and 5000Å thickness at 1000^0C? Given that $B=5.2\times10^5 Å^2/min.$ and $A=111 Å/min.$

2. Attempt **any four** questions : [5×4=20]

(a) Explain the typical Ion Implanter system in detail with suitable diagram.

(b) For boron diffusion in silicon at 1000^0C, the surface concentration is maintained at $10^{19} cm^{-3}$ and diffusion time is 1 hour. Find out total no. of dopant per unit area and a location where the dopant concentration reaches to $10^{15} cm^{-3}$. (Diffusion coefficient$=2\times10^{-14} cm^2/sec$, $erfc^{-1}(10^{-4})=2.75$)

(c) Explain the various types of diffusion systems with help of suitable diagram.

(d) Define the process of epitaxial. Compare between MBE and CVD process.

SBG Study : Download Free Study Material
WWW.SBGSTUDY.COM

(e) Explain molecular beam epitaxial method of epitaxial growth with suitable diagram.

(f) Explain ion range theory. What are the advantages of ion implantation over diffusion process?

3. Attempt **any two** questions : [10×2=20]

(a) What is wet etching process? What are the factors affecting etch rate and compare wet etching with dry etching process?

(b) Why is higher degree of anisotropy required for in VLSI fabrication? And also write the chemical reactions involved in dry etching of SiO_2 and Si by using CF_4 plasma.

(c) Explain dry etching with its working. Calculate the resolution and depth of focus for KrF light source (γ=248 nm) with NA=0.6 and assume that K_1=0.75 & K_2=0.5.

4. Attempt **any two** questions : [10×2=20]

(a) What is Metallization? Write the applications and also explain metallization problems.

SBG Study : Download Free Study Material
WWW.SBGSTUDY.COM

(b) Give the various fabrication steps of PNP transistor with diagram and brief explanation.

(c) Explain the MOS memory IC technology. Compare DRAM and SRAM.

5. Attempt **any two** questions : [10×2=20]

(a) (i) Write a short note on VLSI assembly technologies.

(ii) Describe packaging design consideration in brief.

(b) Describe the different VLSI assembly technologies. What is yield loss in VLSI?

(c) (i) What is importance of reliability requirements?

(ii) How is accelerated testing performed?

----×----