

Roll No. _____

Total Pages : 2

5th Sem. Electronics

8857

BT-5/D07

MICROELECTRONICS

PAPER - ECE-309E

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. a. Explain the process step for the preparation of Electronic Grade Silicon (EGS) and highlight the extraction of various by-products. 10
- b. What are the problem associated with metallization using PVD and how to overcome these problems ? 10
2. a. Explain the Oxide growth kinetics with suitable model. 10
- b. Knowing that one mole of silicon is consumed in one mole of SiO_2 growth; calculate the thickness of silicon consumed in the thermal growth of oxide of layer thickness = X. Given : molecular weight of Si and SiO_2 as 28.9 gm/mole and 60.08 g/mole respectively. Density of Si and SiO_2 is 2.46 gm/cm^3 and 2.34 gm/cm^3 respectively. 5
- c. Write the advantages of High pressure oxidation. 5

UNIT-II

3. a. Discuss the difference between chemical assisted ion beam etching and ion assisted chemical etching. 10
- b. Explain the advantages and disadvantages of Lift off technique. 5

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- c. Explain why etch rate of Si in $\text{CF}_4 + \text{H}_2$ plasma decreases with increasing percent of Hydrogen concentration. 5
4. a. Describe the feature size control and an-isotropic etching. 10
- b. Describe the e-beam lithography technique for VLSI circuit's fabrication. 10

UNIT-III

6. a. Describe the atomistic theory of Diffusion in solids. 10
- b. Describe the evaluation techniques for the characterization of diffused layer ? 10
6. a. Describe the Range theory in ion implantation and importance of retrograde diffusion. 10
- b. Highlight the various advantages of Ion implantation as compared to conventional diffusion techniques. 10

UNIT-IV

7. a. Describe the twin tub CMOS IC fabrication process sequence and highlight the various mask requirements. 12
- b. Describe the various Isolation techniques. 8
8. a. Discuss the various package types used in VLSI circuits. 10
- b. What are Package design considerations ? Discuss in detail. 10

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