

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
M.E. I Year (ECE) I-Semester (Make Up) Examinations, May-2015
(Embedded Systems & VLSI Design)

VLSI Technology

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE questions from Part-B

Part-A (10 X 2=20 Marks)

1. Describe the different types of resistors that are realized on integrated circuits.
2. Discuss the advantages of miniaturization.
3. Explain why poly-silicon is preferred as the gate electrode for a MOSFET?
4. Describe the functions of SiO₂ layers in an IC.
5. Discuss the effects of oxygen contamination in Silicon during crystal growth.
6. Indicate two methods used for measuring thermal oxide thickness.
7. Indicate the advantages of CVD methods of deposition.
8. Compare the two different types of photo resists Used in lithography.
9. Discuss the role of annealing in VLSI processing.
10. Indicate the importance of silicides in VLSI fabrication.

Part-B (5 X 10=50 Marks)

11. a) Explain the structure (cross section and top view) of an nMOSFET in an n-well process with the help of neat sketches. (5)
 b) Explain the different ways in which capacitors can be realized on integrated circuits. (5)
12. a) Describe briefly the process flow for the fabrication of bipolar ICs (7)
 b) Discuss the extra steps needed to convert a CMOS process into a BICMOS process. (3)
13. a) Discuss the importance of epitaxial layers in IC fabrication. (4)
 b) Explain what is meant by solid state epitaxy and describe the process to carry out this process step. (6)
14. a) Describe the chemistries that are used for dry etching of SiO₂ and Si. (4)
 b) Compare the different etching techniques from the point of view of selectivity and anisotropy. (6)
15. a) Describe the atomic models of diffusion. (5)
 b) Discuss the conditions under which the constant source and limited source diffusions take place and indicate the boundary conditions. (5)
16. a) Discuss the impurity segregation during the CZ crystal growth. (5)
 b) A projection exposure system uses a lens of 0.4 numerical aperture and UV light of 365 nm wavelength. Calculate the resolution and the depth of field that can be obtained with this system. (5)
17. a) Explain how the impurity concentration and Junction depth are independently controlled in an Ion implantation process? (4)
 b) Describe the effect of wafer orientation on oxidation. Differentiate between linear and parabolic rates of oxidation. (6)