MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : PE-EC603C CMOS VLSI Design

UPID : 006751

Time Allotted : 3 Hours *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following : [1 x 10 = 10]

(I) Name the oxide material which is used as a gate oxide layer in the MOSFET.

(II) What is diffusion process in VLSI fabrication?

(III) In CMOS logic circuit the n-MOS transistors act as _____ Network.

(IV) What is interconnect delay?

(V) What is SPLD?

(VI) Name the material that is used for gate electrode of MOSFET?

(VII) What type of bias is to be given for a n-channel enhancement type MOSFET ?

(VIII) What is ingot?

(IX) How many transistors will be required to implement a X-input dynamic CMOS logic?

(X) What do you mean by Global Routing?

(XI) What is the output of physical design ?

(XII) What is the unit of trans-conductance parameter of MOSFET ?

Group-B (Short Answer Type Question)

Answer any three of the following : [5 x 3 = 15]

2. Discuss the principle of operation of MOSFET [5]
3. What are the advantages of using SiO2 in VLSI circuits? Write down Fick's equations (one dimension) for diffusion. [5]
4. Describe three design domains in VLSI using Y-chart. [5]
5. Briefly Explain the Narrow channel effects in MOSFET? [5]
6. Describe Photolithography process with diagram. [5]

Group-C (Long Answer Type Question)

Answer any three of the following : [15 x 3 = 45]

7. (a) State Moore's law. What are the advantages of using CMOS compared to BJT. [5]
   (b) What do you mean by hierarchy, regularity, modularity & Locality of any VLSI design. [6]
   (c) Explain the features of ASIC [4]
8. (a) Explain the principle of operation of n- channel MOSFET . [8]
   (b) Draw the MOSFET I-V Characteristics and explain the different regions. [7]
9. (a) Discuss Different types of Small Geometry effects in a MOSFET. [12]
   (b) Explain different Narrow channel effects in MOSFET? [3]
10. (a) With suitable diagram describe the nMOS fabrication process . [10]
    (b) Briefly explain about etching process. [5]
11. (a) Explain the different steps of twin tub CMOS process of fabrication using n-well and p-well. [10]
    (b) Explain the fabrication of SiO_2 using the dry oxidation technique. [5]

*** END OF PAPER ***