MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : OE-601C/OE-EE601C VLSI And Micro Electronics

UPID : 006748

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) Two-input NAND gate requires six transistors in static CMOS logic. (True / False).

(II) Upon exposure, the positive photoresist becomes _____ soluble in the developer solution.

(III) In VHDL , the process statement is a sequential statement.(True / False)

(IV) What are the major advantages of the IC over discrete component based circuits ?

(V) Polysilicon is used for gate in MOSFET because it has lattice matching with Si. (True / False).

(VI) Unit of sheet resistance is _____.

(VII) Pull-down network (PDN) connects output node to _____ .

(VIII) If the value of segregation coefficient is greater than one, it signifies that the dopant concentration is more in solid than liquid. (True / False).

(IX) In VHDL, the '&' operator indicates _____ operation.

(X) State Moore's law

(XI) In combinational logic circuit, the output is determined by present logic inputs. (True / False).

(XII) Dry etching is used when vertical side walls are required. (True / False).

Group-B (Short Answer Type Question)

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

2. Define regularity , modularity and locality. [5]
3. Discuss the MOS system with C-V characteristics. [5]
4. Draw the flow diagram of typical VLSI design flow and explain. [5]
5. Explain with diagram, the operation of Enhancement type pMOS Transistor. [5]
6. Write Verilog program for (a) two-input AND gate & (b) latch. [5]

Group-C (Long Answer Type Question)

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

7. Deduce the MOSFET drain current equations of a n-type MOSFET for linear and saturation region keeping substrate bias effect. [15]
8. What is Epitaxial Growth ? Explain their various methods. [15]
9. (a) Discuss about advantages and disadvantages of MOSFET scaling. [7]
   (b) Explain narrow channel effects of MOSFET. [8]
10. (a) What is oxidation ? Explain its various methods. [9]
    (b) Discuss about (a) thin oxide and (b) thick oxide. [6]
11. (a) How IC's are classified ? Explain. [8]
    (b) Briefly describe about VLSI design methodology. [7]

*** END OF PAPER ***