Code No. 2266

FACULTY OF INFORMATICS

B.E. 4/4 (IT) I-Semester **(Supplementary)** Examination, May 2013

Subject : **VLSI Design**

Time : 3 Hours Max. Marks: 75

Note: Answer **all** questions of Part - A and answer any **five** questions from Part-B.

PART – A (25 Marks)

1. Draw the VLSI chip design hierarchy. (3)
2. What is meant by full-custom and semi-custom design? (2)
3. Implement a three input NOR gate using CMOS logic. (2)
4. What are the advantages of Transmission gate logic? (2)
5. Mention the different layers are used in VLSI design for drawing the layout and their colours. (3)
6. What is meant by Design Rule? Give one example. (2)
7. Draw ITDRAM cell and explain its Read / Write operation. (3)
8. What is EPROM? How it is different from EPROM. (2)
9. Suppose a signal delay on an interconnect of length 40μm is known to be 0.12ps. If the line is increased to 100μm. What is the signal delay? (3)
10. Define cross talks, write the equation for coupling capacitor. (3)

PART – B (5x10=50 Marks)

11.(a) Draw and explain the electrical characteristics of n MOSFET. (5)
(b) Design a 4 to 1 MUX using Transmission Gate logic and explain its operation. (5)

12.(a) Show that N MOSFET device Linear Resistance (5)

$$R_n = \frac{1}{\mu n Cox\left(\frac{w}{L}\right)(V_G - V_{Tn})}$$

(b) An interconnect line runs over an insulated oxide layer that is 10,000 A^o thick. The line width of 0.5 μm and is 40 μm long. The sheet resistance is 25 Ω. (5)
(i) Find the line resistance
(ii) Find the line capacitance
(iii) Find the Time constant [use ε_{ox}=3.453 x 10^{-13} F/cm]

13. Explain the CMOS process flow in the fabrication process. (10)

14.(a) Explain CMOS inverter switching characteristics. (5)
(b) What is Lithography? Explain in detail. (5)

15.(a) Draw a 2 input XOR – XNOR logic Gate using differential cascode voltage switch logic and explain its operation. (5)
(b) Explain Read and write operation of 6T's RAM cell. (5)

16.(a) Explain about behavioural and RTL model. (5)
(b) Write a behavioural description of D-Flip-Flop. (5)

17.(a) Explain Floor planning and routing. (5)
(b) What are high speed adders explain any two? (5)

*****