

## FACULTY OF ENGINEERING

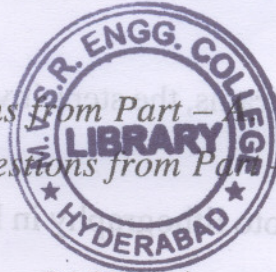
B.E. 4/4 (E&amp;EE/Inst/ECE) I Semester (Main) Examination, December 2010

## VLSI DESIGN (Elective – I)

Time : 3 Hours]

[Max. Marks : 75

Note : 1) Answer all questions from Part – A.  
2) Answer any five questions from Part – B.



PART – A

(25 Marks)

1. What are simulators ? Mention any two types. 2
2. Realize a 2 input NAND gate in VLSI circuits. 2
3. Compare the gm of bipolar and CMOS transistor. 3
4. Explain why CMOS gates are called NOT based logic gates. 2
5. Draw the diagram of a CMOS current mirror. 2
6. Draw the circuit of a latch (D) based on cross coupled NOR gates. Realize the same using CMOS logic and explain. 3
7. What is photoresist and what is its importance in VLSI processing ? 3
8. Explain the terms “setup time” and “hold time” in relation to a CMOS D register. 3
9. Explain what is meant by universal shift register. 2
10. Explain what do you understand by pseudo NMOS logic. 3

PART – B

(50 Marks)

11. a) What are the different pull-up structures used in MOS based inverters ? What are the relative advantages and disadvantages of each of these structures ? 8
- b) Which of the above structures has the fastest response ? 2

12. a) Explain the design of CMOS converter. Derive the relevant expression for rise time and fall time. 6
- b) How do you design NAND and NOR gates ? Draw the circuit and layout diagrams. 4
13. a) Explain with relevant diagrams, the steps involved in CMOS P-well fabrication process. 6
- b) Explain the process of photo lithography in IC fabrication. 4
14. a) Explain the operation of a SRAM memory. 5
- b) Write about chemical vapour deposition. 5
15. a) Design 8 to 1 MUX using pass transistor logic and explain. 4
- b) Write about etching. 2
- c) Write about oxidation. 3
16. a) Derive an expression for O/P voltage for an adder circuit, with a current mirror used to supply the bias current. 2
- b) Give the design rules for CMOS. 2
17. Write short notes on : 3
- a) Counter shift registers 3
- b) Design latches 3
- c) Optical lithography. 2