

Bengal Engineering & Science University, Shibpur
BE 7th Semester, (CST) Examination, December, 2011

Subject: VLSI Design
Time: 3 Hours

Paper: CS-704
Full Marks: 70

Answer any five questions

- 1(a) Explain why p-MOS transistor produce a strong '1' but a weak '0' while an n-MOS produce the opposite. How these behaviors restrict their use in a CMOS gate?
(b) Given a function $f = \bar{x}_1x_2 + x_1\bar{x}_2 + x_3x_4 + \bar{x}_3\bar{x}_4 + \bar{x}_1x_3$. Draw PS-PS, SP-SP, realization of the CMOS circuit. (5+5)+4
- 2 (a) How nMOS transistor can be used as a switch and a pass transistor? What is the difference between n-channel and p-channel pass transistor? 4+4
(b) Design a AND/NAND, OR/NOR and XOR Gate using complementary pass Transistor logic. 6
- 3 (a) Draw the flowchart of Genetic algorithm for circuit partitioning? 6
b) Illustrate the Feduccia Mattheyses (FM) algorithm for bi-partitioning with an example. 6
(c) What is the time complexity of FM algorithm. 2
- 4a) What are the objectives of floor planning? 4
b) What are the characteristics of rectangular dualization of the floor plan? 5
c) What is meant by hierarchically defined floor plan? Is it sliceable? 5
-Explain with example
- 5 (a) What is the transmission gate? What is its advantage? 6
(b) Find out the delay for n cascaded Pass transistor with Resistance and capacitance of each stage. Why a cascade of not more than 3 or 4 switches should be used in any steering logic? 6+2
6. (a) Draw circuit diagram of two input (modified) DCVS EX-OR gate. 4.
(b) Design EXOR, EXNOR circuit using transmission gate and inverter. 6
(c) What are the disadvantages of multiplexer design using nMOS two variable function block.? 4
7. (a) Distinguish between clocked CMOS logic and Precharged Domino CMOS logic. 5
(b) Draw a XOR and EXNOR circuit using CMOS Transistors. 4
(c) What are the problems in single phase clocking scheme? How are they avoided in two-phase clocking scheme? 5
- 8a) What are the objectives of placement? 3
b) What are the difference between spanning tree and steiner tree? 3
c) Illustrate genetic algorithm based method (GALLO) for sizing of the rectangular blocks with example. 8