Subject: VLSI Design   Paper: CS-704
Time: 3 Hours   Full Marks: 70

Answer any <u>five</u> questions

1a) What is propagation delay and how it is measured? Explain Elmore delay formula for computing delay of an RC-tree.   7

b) Use the above method to compute the delay of a resistive capacitive wire of length L. Assume r and c as per unite length values of resistance and capacitance respectively of the wire.   7

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) Illustrate the Simulated Annealing algorithm for circuit partitioning?   6

b) Explain Heavy-edge clustering algorithm for partitioning the circuit 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 ?
–Explain with example   5

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