

QP Code : 15686

(3 Hours)

[Total Marks : 100]

- N.B. :** (1) Questions No. 1 is **compulsory**.
 (2) Answer any Four questions out of remaining six questions.
 (3) Assume any suitable data wherever required

1. (a) Explain H tree clock distribution. 5
 (b) Explain how ESD (electro-static discharge) affect the MOSFET. 5
 (c) If the width and length of the interconnect is reduced by 30%, then the propagation delay of an interconnect will increase or decrease, by how much %? 5
 (d) Draw and explain Carry save adder. 5
2. (a) What would be the conductor width of power and ground wires to a 50 MHz clock buffer that drives 100 pF of on-chip load to satisfy the metal-migration consideration ($J_{AL} = 0.5 \text{ mA}/\mu\text{m}$)? What is the ground bounce with chosen conductor size? The module is $500 \mu\text{m}$ from both the power and ground pads and the supply voltage is 5 volts. The rise/fall time of clock is 1ns. (Assume sheet resistance of wire = $0.05 \Omega \text{ sq}$). 10
 (b) Draw 1T1R DRAM cell and explain its write, read, hold and refresh operation. 10
3. (a) Explain 4-bit CLA adder with its carry equations, logical network and write its Verilog description. 10
 (b) Give and explain CMOS input protection circuits. 10
4. (a) Give and explain the maximum and minimum frequency calculation of clock signal which determine the data transfer rate through cascade system. 10
 (b) Draw 4x4 pseudo-n MOS ROM array circuitry having stored following data. 0011, 1010, 1100, 0101. Also list the no. of address pins, data pins and word lines. 10
5. (a) Explain the need of frequency compensation in CMOS operational amplifier. 10
 (b) Give and explain single phase clock system and explain its drawback. 10
6. (a) Explain various technique of clock generation and clock stabilization. 10
 (b) What is cross talk in IC's? Explain various methods to reduce it. 10
7. Write short notes on any three 20
 - (a) Manchester carry chain circuits
 - (b) Reliability issues in CMOS circuits
 - (c) Low power design consideration
 - (d) Switch capacitor amplifier.