

B. TECH
(SEM-VII) THEORY EXAMINATION 2018-19
VLSI DESIGN

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20
- a. Why we need a low power VLSI circuits in today's scenario?
 - b. Explain the terms packaging and testing.
 - c. Define logical effort with example.
 - d. Define the terms- Defects, Errors and Faults.
 - e. Distinguish between SRAM and DRAM.
 - f. Bring out the drawbacks of dynamic logic.
 - g. Explain the term controllability and observability.
 - h. Why we prefer CMOS transmission gates over other gates?
 - i. Define the term Interconnect.
 - j. What is meant by Stuck-at-1(s-a-1) fault and Stuck-at-0(s-a-0) faults.

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30
- a. Illustrate the n-well CMOS fabrication process with neat diagrams.
 - b. Explain the Elmore Delay Model with suitable diagram.
 - c. Write short note on:
 - (i) Logical Effort
 - (ii) Parasitic Delay
 - d. Enlist the advantages of dynamic logic circuit over static logic circuit. Explain NORA CMOS logic circuit with suitable example.
 - e. Describe leakage power dissipation and dynamic power dissipation.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10
- (a) (i) Write short note on VLSI testing.
(ii) Draw and explain the VLSI design Flow(Y-chart).
 - (b) Draw and explain the working of CMOS inverter with its transfer characteristics.
4. Attempt any *one* part of the following: 10 x 1 = 10
- (a) Analyze the Linear delay model with its different limitations.
 - (b) Explain the following circuits:
 - (i) Variable threshold CMOS circuits
 - (ii) Multiple threshold CMOS circuits
5. Attempt any *one* part of the following: 10 x 1 = 10
- (a) Draw and explain the working of Lumped RC-model for interconnects.
 - (b) Explain the Delay Estimation with different optimization techniques.

6. **Attempt any one part of the following:**

10 x 1 = 10

- (a) Explain read/write operation of SRAM memory cell. How 1-bit cell is used in bigger memory systems.
- (b) (i) Implement the Boolean function $Y = AB + (C+D)(F+E)+GH$ using DOMINO CMOS logic.
(ii) Explain the term Voltage Boot Strapping in CMOS logic with suitable examples.

7. **Attempt any one part of the following:**

10 x 1 = 10

- (a) Explain the issues involved in Built-in Self Test (BIST) techniques in detail.
- (b) (i) Write a short note on Adiabatic Logic Circuit.
(ii) Explain the Scan Based Techniques.

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