



USN

--	--	--	--	--	--	--	--	--	--

10EC56

Fifth Semester B.E. Degree Examination, Aug./Sept. 2020
Fundamentals of CMOS VLSI

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. With neat diagram, explain the step by step procedure of fabrication steps of CMOS P-well process and write the mask sequence. (10 Marks)
b. Derive the necessary expressions for V_{out} in all the regions of CMOS inverter? Explain. (10 Marks)
- 2 a. What is body effect? Which parameters are responsible for it? (08 Marks)
b. Explain the Pseudo-NMOS logic structure and their salient features with example. (08 Marks)
c. Compare CMOS and bipolar technologies. (04 Marks)
- 3 a. Explain the operation of CMOS dynamic logic. Also discuss the cascading problem of dynamic CMOS logic. (10 Marks)
b. Implement using CMOS logic structure and its stick diagram:
(i) $Z = A + B + CD$.
(ii) $Z = A(D + E) + BC$ (10 Marks)
- 4 a. What are the scaling factors of,
(i) Parasitic capacitance C_x .
(ii) Power dissipation per unit area P_a . (04 Marks)
b. Two nMOS inverters are cascaded to drive capacitive load $C_L = 16C_g$ as shown in Fig. Q4(b). Calculate pair delay V_{in} to V_{out} in terms of τ . (06 Marks)

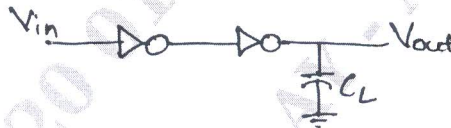


Fig. Q4 (b)

- c. Explain with circuit diagram the super buffers with inverting type and non-inverting type of nMOS. (10 Marks)

PART – B

- 5 a. Explain structured design of bus arbitration logic for n-line bus. (10 Marks)
b. Discuss the architectural issues to be followed in the design of VLSI subsystems. (10 Marks)
- 6 a. Design a 4:1 multiplexer using nMOS logic and CMOS logic. (10 Marks)
b. Explain the implementation of ALU functions with a standard adder. (10 Marks)
- 7 a. How to read or write and hold the bit in SRAM cell? (10 Marks)
b. Discuss CMOS pseudo-static memory cell with stick diagram. (10 Marks)
- 8 a. Explain sensitized path based testing for combinational logic. (10 Marks)
b. Write a note on testability and testing. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.