

CBCS SCHEME

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15EC63

Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020

VLSI Design

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1. a. Explain the step-by-step CMOS P-Well fabrication process. (16 Marks)
 b. With the mathematical equations, explain velocity saturation and mobility degradation effect due to increase in saturation current. (16 Marks)

OR

2. a. With the transfer characteristic of skewed inverter, explain the beta ratio effects. (16 Marks)
 b. Compare CMOS and Bipolar technologies. (16 Marks)
 c. Consider the nMOS transistor in a 180 nm process with a nominal threshold of 0.4V and doping level of $8 \times 10^{17} \text{ cm}^{-3}$. The body is tied to ground with a silicidate contact. How much does the threshold change at room temperature if the source is at 1.1V instead of '0'? (14 Marks)

Module-2

3. a. Discuss the k-based design rules (i) Buffering circuit (ii) Transistors (nMOS, pMOS and CMOS). (16 Marks)
 b. Derive the expression of delay between of a CMOS inverter pair. (16 Marks)

OR

4. a. Draw the layout for $Y = A + BC$ using CMOS. (16 Marks)
 b. Find the C_{in} for the layout shown in Fig. Q4(b). (16 Marks)

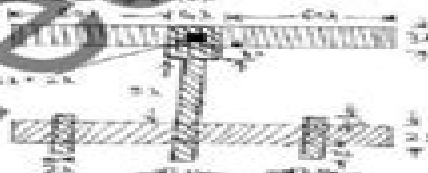


Fig. Q4(b)

Module-3

5. a. Define scaling. Explain the scaling factors for device parameters. (16 Marks)
 b. What is Manchester Carry Chain? Explain it. (16 Marks)

OR

6. a. What are the problems associated with VLSI design and how to reduce by using standard practice? (16 Marks)
 b. Draw the 4 x 4 cross bar switch using MOS switches and explain it. (16 Marks)
 c. Calculate the Regularity for 4 x 4 bit and 8 x 8 bit shifter. (14 Marks)

1 of 2

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