CMOS basics

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Lab due Oct 24, 2016 21:59 -02 Past due

CMOS Basics

0.0/2.0 points (graded)

The following questions are multiple-choice. Using the "check" button, you can of course simply keep guessing until you get the right answer. But you'll be in a much better position to take the quizzes if you take the time to actually figure out the answers.

1. If we set the inputs of a particular CMOS gate to voltages that correspond to valid logic levels, we would expect the *static* power dissipation of the gate to be

   - (●) essentially zero ✔ ✔
   - ( ) depends on whether output voltage is low or high
   - ( ) unknown with the facts given

2. Measuring a particular CMOS device G, we find 1.5V noise margins. If the *width* of all mosfets inside of G were doubled, we would expect the noise margins of the new gate to

   - (●) stay about the same ✔
   - ( ) increase noticeably
   - ( ) decrease noticeably
   - ( ) change noticeably, but can't tell which way

3. To *decrease* the output rise time of a CMOS gate one could

   - ( ) increase the length of all pfets
   - (●) increase the width of all pfets ✔ ✔
   - ( ) increase the length of all nfets
   - ( ) increase the width of all nfets
   - ( ) none of the above

4. The Boolean function $F(A, B, C, D)$ of four inputs is implemented as a single CMOS gate whose output connects to a pullup circuit containing only PFETs and a pulldown containing only NFETs. The output of F is known to depend on its inputs; i.e., $F(A, B, C, D)$ is 0 for certain input combinations and 1 for others. What can you deduce about $F(1, 1, 1, 1)$?

   - (●) $F(1, 1, 1, 1)$ will be 0 ✔ ✔
   - ( ) $F(1, 1, 1, 1)$ will be 1
   - ( ) can't tell

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Answers are displayed within the problem

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Topic: Assignment 2 (due Oct 24) / CMOS basics

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? Noise Margins
Why would noise margins remain same even after doubling the width of the mosfets? 2

Output Rise Time
Why increasing the width of all pfets will decrease the output rise time? Isn't that increasing the width of pfets make them stronger ... 2

Static Power Dissipation
How would I go about answering the first question? I know that it is asking for the power dissipation with unchanging inputs, but I d... 2

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