

<u>Help</u>





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**Tutorial: CMOS Continued** 

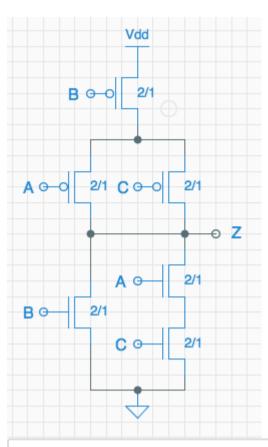
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#### **CMOS**

1/1 point (ungraded)

Given the following cmos gate, determine the function computed by this gate.



- $\bigcirc$  A)  $Z = B \cdot (A + C)$
- $\bigcirc$  B)  $Z=B+A\cdot C$
- $\bigcirc$  C)  $Z = \overline{B} \cdot (\overline{A} + \overline{C})$
- $\bigcirc$  D)  $Z=\overline{B}+\overline{A}\cdot\overline{C}$
- ( E) None of the above



Explanation

Looking at the pulldown circuitry for this gate, we see that  $Z=\overline{B+A\cdot C}$ . To simplify this, we use DeMorgan's Law to find that  $Z=\overline{B}\cdot\overline{A\cdot C}=\overline{B}\cdot(\overline{A}+\overline{C})$ .

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• Answers are displayed within the problem

## **CMOS**

1 point possible (ungraded)

What is the minimum number of NFETs required to build a CMOS circuit (perhaps involving more than one CMOS gate) that has the following truth table?

$\boldsymbol{A}$	B	C	G
0	0	0	1
0	0	1	0
0	1	0	1

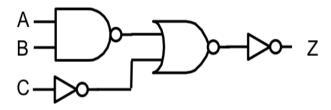
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0	1	1	0		
1	0	0	1		
1	0	1	1		
1	1	0	0		
1	1	1	0		
	A) (	3			
○ B) 4					
$\bigcirc$	C) !	5			
$\bigcirc$	D) (	6			
E) None of the above					
Sı	ıbmit	t			

## **CMOS**

2 points possible (ungraded)

Consider the following circuit that implements the 3-input function Z(A,B,C):



Which of the proposals below is the best way to shorten the rise time of the signal at Z?

- P1: Add two additional series-connected inverters to the output.
- P2: Double the width of the NFET in the output inverter.
- P3: Double the width of the PFET in the output inverter.
- P4: Halve the width of the NFET in the output inverter.
- P5: Halve the width of the PFET in the output inverter.

Best proposal: Select an option ➤

Can the function Z(A, B, C) be implemented as a single 3-input CMOS gate having complementary pullup/pulldown circuits?

Implement as a single CMOS gate? Select an option ➤

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#### Discussion

Topic: 4. Combinational Logic / Tutorial: CMOS Continued

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Show all posts by recent activity by recent activity why more current causes faster rise time?

I'm not surprised though, but why exactly is that? I don't remember learning it in the course.

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