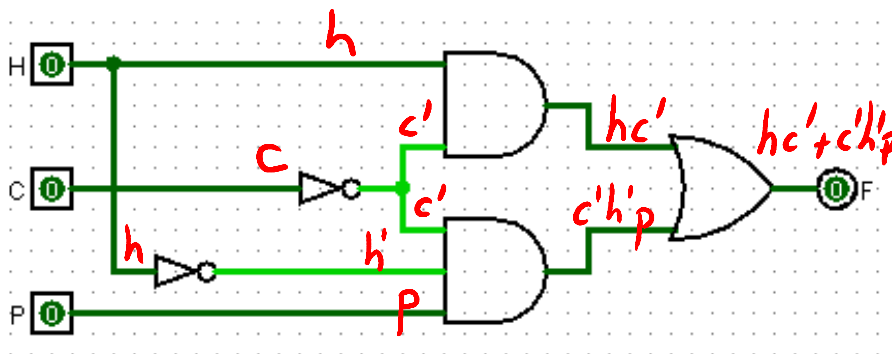


Half-hour Examination #1 - 30 minutes
Closed Book, one 8.5x11" page of notes (double-sided)

NAME _____ Pilot ID: w _____ SCORE _____ / 20

All problems on this examination require you to analyze combinational devices and representations and to produce equivalent forms of representation. For each problem, you will be provided with one form of representation: a logic diagram, a Boolean equation, or a truth table. Your task is to provide equivalent representations for the same functionality for all of the representations not provided. For example, if you are given a truth table, you must provide a functionally equivalent equation and a logic diagram. Make certain to use good documentation practices! Label ALL connections in your diagrams appropriately!

For timing questions involving propagation delay, assume that all combinational gates in the logic diagram have a minimum propagation delay equal to the number of inputs to the device (in nanoseconds) and a maximum propagation delay equal to twice the number of its inputs. For example, a 2-input AND gate would have a $t_{pd,min} = 2ns$ and a $t_{pd,max} = 4ns$. A 3-input AND gate would have a $t_{pd,min} = 3ns$ and a $t_{pd,max} = 6ns$.

EXAMPLE Problem #0**LOGIC DIAGRAM [0 pts]****TIMING [0 pts]**

For the device shown:

$T_{pd}(min)$: 4 ns

$T_{pd}(max)$: 12 ns

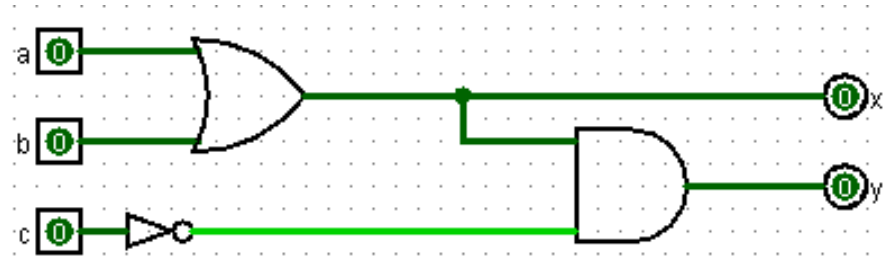
TRUTH TABLE [0 pts]

hcp (in hex)	h	c	p	f	f (in hex)
x0	0	0	0	0	x0
x1	0	0	1	1	x1
x2	0	1	0	0	x0
x3	0	1	1	0	x0
x4	1	0	0	1	x1
x5	1	0	1	1	x1
x6	1	1	0	0	x0
x7	1	1	1	0	x0

EQUATION [0 pts]

$$F = h\bar{c} + \bar{c}h'p$$

Half-hour Examination #1 - 30 minutes
Closed Book, one 8.5x11" page of notes (double-sided)

Problem #1**LOGIC DIAGRAM [0 pts]****TIMING [2 pts]**

For the device shown:

 $T_{pd}(\min)$: _____ ns $T_{pd}(\max)$: _____ ns**TRUTH TABLE [2 pts]**

abc (in hex)	a	b	c	x	y	xy (in hex)
x0	0	0	0			
x1	0	0	1			
x2	0	1	0			
x3	0	1	1			
x4	1	0	0			
x5	1	0	1			
x6	1	1	0			
x7	1	1	1			

EQUATION [2 pts]**EXAMPLE Problem #2****LOGIC DIAGRAM [3 pts]****TIMING [2 pts]**

For the device shown:

 $T_{pd}(\min)$: _____ ns $T_{pd}(\max)$: _____ ns**TRUTH TABLE [0 pts]**

abc (in hex)	a	b	c	x	y	xy (in hex)
x0	0	0	0	0	0	x0
x1	0	0	1	0	0	x0
x2	0	1	0	1	0	x2
x3	0	1	1	1	0	x2
x4	1	0	0	1	0	x2
x5	1	0	1	1	1	x3
x6	1	1	0	1	0	x2
x7	1	1	1	1	1	x3

EQUATION [2 pts]

Half-hour Examination #1 - 30 minutes
Closed Book, one 8.5x11" page of notes (double-sided)

Problem #3

LOGIC DIAGRAM [3 pts]	TIMING [2 pts] For the device shown: T_{pd}(min): _____ ns T_{pd}(max): _____ ns																																																												
TRUTH TABLE [2 pts] <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> abc (in hex) <table border="1" style="border-collapse: collapse; margin: 0 auto;"> <tr><td>x0</td></tr> <tr><td>x1</td></tr> <tr><td>x2</td></tr> <tr><td>x3</td></tr> <tr><td>x4</td></tr> <tr><td>x5</td></tr> <tr><td>x6</td></tr> <tr><td>x7</td></tr> </table> </div> <div style="text-align: center;"> <table border="1" style="border-collapse: collapse; margin: 0 auto;"> <tr> <th>a</th><th>b</th><th>c</th><th>x</th><th>y</th></tr> <tr><td>0</td><td>0</td><td>0</td><td></td><td></td></tr> <tr><td>0</td><td>0</td><td>1</td><td></td><td></td></tr> <tr><td>0</td><td>1</td><td>0</td><td></td><td></td></tr> <tr><td>0</td><td>1</td><td>1</td><td></td><td></td></tr> <tr><td>1</td><td>0</td><td>0</td><td></td><td></td></tr> <tr><td>1</td><td>0</td><td>1</td><td></td><td></td></tr> <tr><td>1</td><td>1</td><td>0</td><td></td><td></td></tr> <tr><td>1</td><td>1</td><td>1</td><td></td><td></td></tr> </table> </div> <div style="text-align: center;"> xy (in hex) <table border="1" style="border-collapse: collapse; margin: 0 auto;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table> </div> </div>	x0	x1	x2	x3	x4	x5	x6	x7	a	b	c	x	y	0	0	0			0	0	1			0	1	0			0	1	1			1	0	0			1	0	1			1	1	0			1	1	1										
x0																																																													
x1																																																													
x2																																																													
x3																																																													
x4																																																													
x5																																																													
x6																																																													
x7																																																													
a	b	c	x	y																																																									
0	0	0																																																											
0	0	1																																																											
0	1	0																																																											
0	1	1																																																											
1	0	0																																																											
1	0	1																																																											
1	1	0																																																											
1	1	1																																																											

Half-hour Examination #1 - 30 minutes
Closed Book, one 8.5x11" page of notes (double-sided)

DO NOT BEGIN UNTIL INSTRUCTED TO DO SO

HONOR CODE: Before the end of the examination, please sign:

In recognition of and in the spirit of the Wright State University policies of academic honesty, I certify that I have neither given nor received unpermitted aid in this examination.

Name (Printed): _____

Signature: _____

DO NOT BEGIN UNTIL INSTRUCTED TO DO SO
