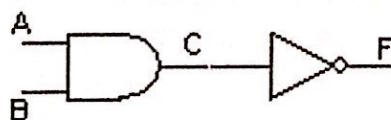


D. Preliminary Work

1. Draw a symbol, determine the IC number and produce a truth table for the following gate.

<u>AND</u>	<u>NAND</u>																																				
Symbol:  IC Number: 7408 Truth Table 1 <table border="1" style="margin: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">Input</th> <th>Output</th> </tr> <tr> <th>A</th> <th>B</th> <th>F</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td></tr> </tbody> </table>	Input		Output	A	B	F	0	0	0	0	1	0	1	0	0	1	1	1	Symbol:  IC Number: 7400 Truth Table 2 <table border="1" style="margin: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">Input</th> <th>Output</th> </tr> <tr> <th>A</th> <th>B</th> <th>F</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td></tr> </tbody> </table>	Input		Output	A	B	F	0	0	1	0	1	1	1	0	1	1	1	0
Input		Output																																			
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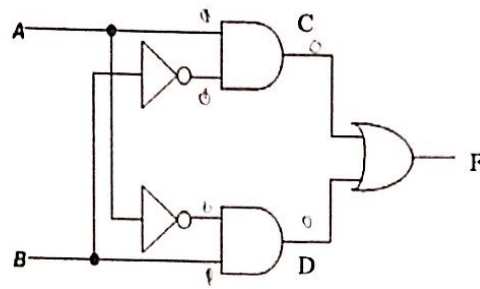
2. Complete the truth table for the following circuit.



Truth Table 3

A	B	C	F
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0

3. Write the Boolean expression for output C, D and F the following circuit.



$$C = A \cdot \bar{B}$$

$$D = \bar{B} \cdot \bar{A}$$

$$F = C + D$$

4. Complete the truth table for the circuit in (3) based on the Boolean expression produced for C, D and F.

Truth Table 4

A	B	C	D	F
0	0	0	0	0
1	0	1	0	1
0	1	0	1	1
1	1	0	0	0

E. Laboratory Work

Part 1

1. Construct Circuit 1 on the breadboard. Connect all inputs (A, B) to a switches and output F to LEDs.

Truth Table 5



Circuit 1

Input		Output
A	B	F
0	0	0
0	1	0
1	0	0
1	1	1

2. Test Circuit 1 and fill in Truth Table 5 for the circuit response to all possible input combinations. The Truth Table 5 should match the Truth Table 1 prepared in the Preliminary Work.



Fully Completed ☐

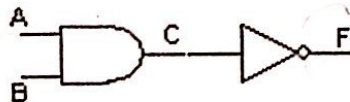
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Part 2

3. Construct Circuit 2 on the breadboard. Connect all inputs (A, B) to a switches and output C and F to LEDs.

Truth Table 6



Circuit 2

A	B	C	F
0	0	0	1
1	0	0	1
0	1	0	1
1	1	1	0

4. Test Circuit 2; fill in Truth Table 6, for the circuit response to all possible input combinations.
5. Compare Truth Table 6 to Truth Table 2. What conclusion can you make?

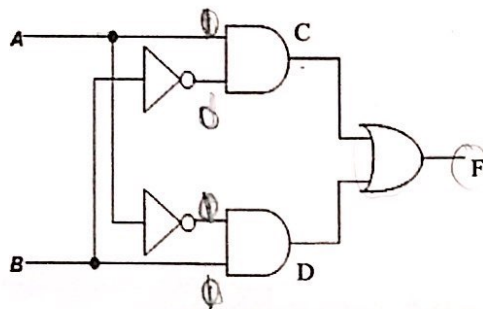


Fully ☐

Partially ☐

Part 3

6. Construct circuit 3 on the breadboard. Connect all inputs (A, B) to a switches and output C, D and F to LEDs.



Circuit 3

Truth Table 7

A	B	C	D	F
0	0	0	0	0
1	0	1	0	1
0	1	0	1	1
1	1	0	0	0

7. Test Circuit 3; fill in Truth Table 7 for the circuit outputs (C, D, and F) for all possible input combinations.
8. What single gate does Circuit 3 represent?

XOR gates

P	Q	C
0	0	0
0	1	1
1	0	1
1	1	0



Fully Completed ☐

Partially Completed ☐

Checked by: _____