DIGITAL CIRCUIT AND LOGIC DESIGN LAB ASSIGNMENT

NATIONAL INSTITUTE OF TECHNOLOGY, AGARTALA

P.O: Former Tripura Engineering College

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SL.NO	EXPERIMENT	DATE
1	To study about logic gates and verify their truth tables.	26/08/2021

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Experiment No.1

Study of Logic gates

Objective: To study about logic gates and verify their truth tables.

Equipment: Logic Circuit Simulator Pro Application.

Theory: Circuit that takes the logical decision and the process are called logic gates. Each gate has one or more input and only one output. OR, AND and NOT are basic gates. NAND, NOR and X-OR are known as universal gates. Basic gates from these gates.

AND GATE: The AND GATE performs a logical multiplication commonly known as AND function. The output is high when both the inputs are high. The output is low level when any one of the inputs is low.

OR GATE: The OR gate performs a logical addition commonly known as OR function. The output is high when any one of the inputs is high. The output is low level when both the inputs are low.

NOT GATE : The NOT gate is called an inverter. The output is high when the input is low. The output is low when the input is high.

NAND GATE: The NAND gate is a contraction of AND-NOT. The output is high when both inputs are low and any one of the input is low. The output is low level when both inputs are high.

NOR GATE: The NOR gate is a contraction of OR-NOT. The output is high when both inputs are low. The output is low when one or both inputs are high.

X-OR GATE: The output is high when any one of the inputs is high. The output is low when both the inputs are low and both the inputs are high.

PROCEDURE:

1. Firstly we have to install the LOGIC CIRCUIT SIMULATOR PRO APP and then after opening it we have to make a new project.

2. Then we have to add the required elements to make the circuits i.e LOGIC gates, inputs, outputs etc.

3. Then connect the elements together with the help of path to form a circuit and through the given gates we have to connect the input and output.

4. Lastly, we have to apply the TOUCH button to turn on/off the inputs i.e the switch by clicking on it, then we have to observe the output from output section and verify the given truth tables.
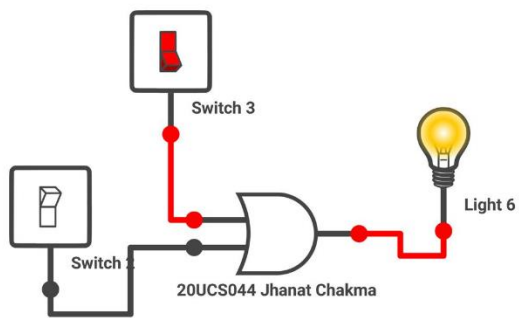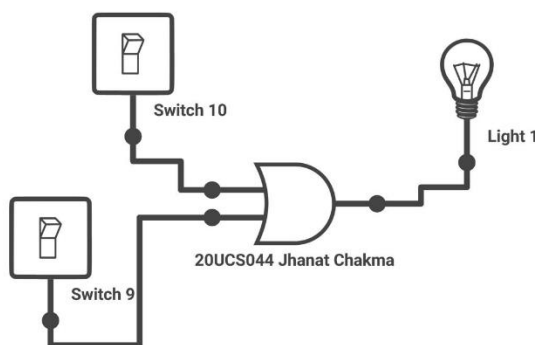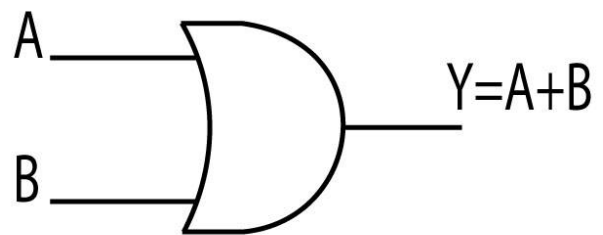
AND GATE:

Symbol:
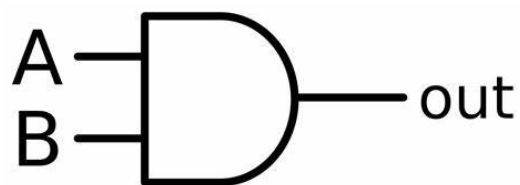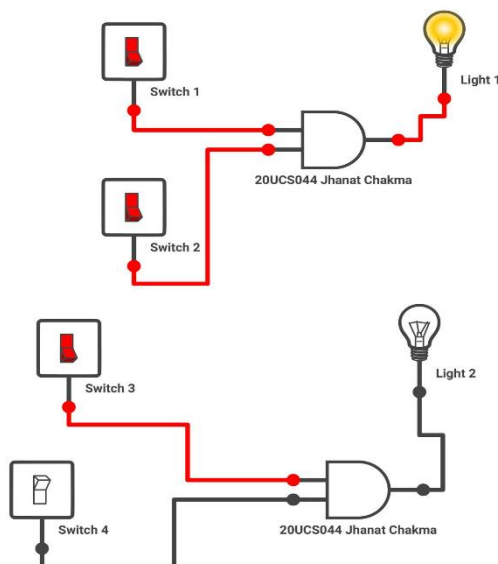
TRUTH TABLE:

A	B	AB
0	0	0
0	1	0
1	0	0
1	1	1

OR GATE

Symbol:

$$Y = A + B$$

TRUTH TABLE:

A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1

NOT GATE

Symbol:

Light 4

Switch 3

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Input A —— B Output

Switch 14

Light 1

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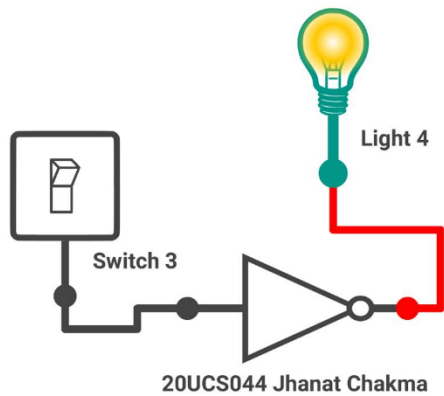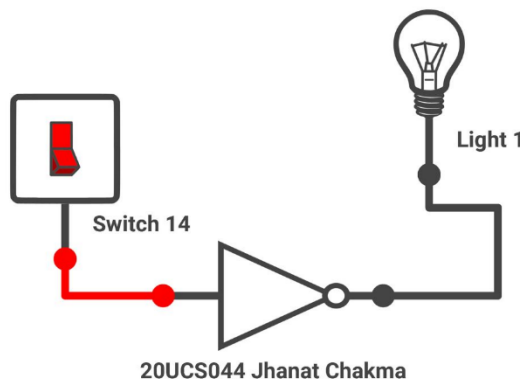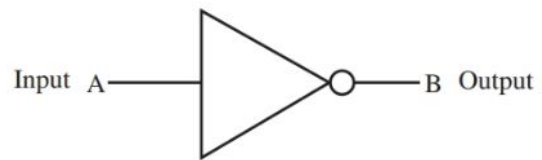
TRUTH TABLE:

A	$\overline{A}$
0	1
1	0

XOR GATE   Symbol:
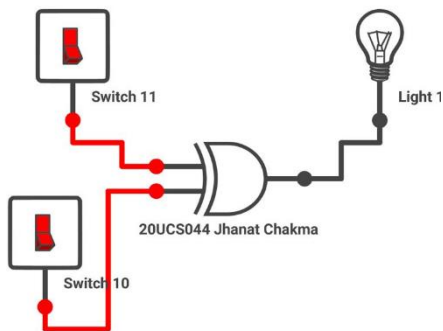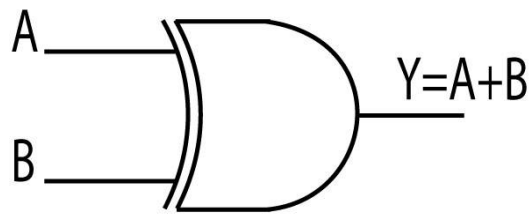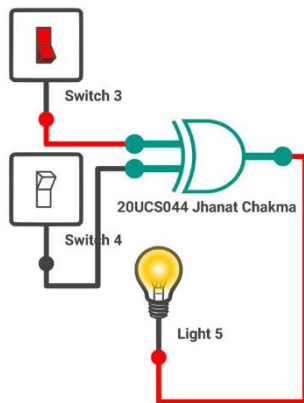
TRUTH TABLE:

A	B	$\overline{A}B + A\overline{B}$
0	0	0
0	1	1
1	0	1
1	1	0

NAND GATE   Symbol:

$$\overline{A \cdot B}$$
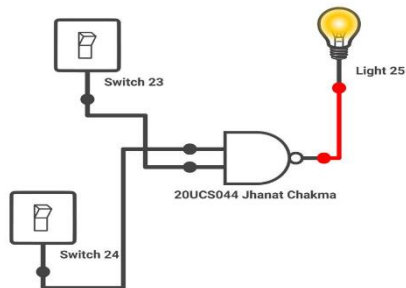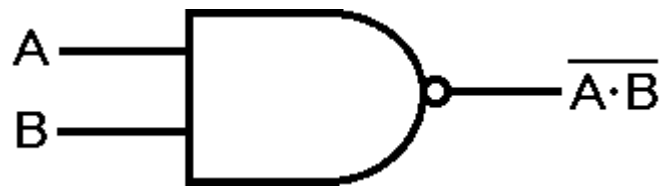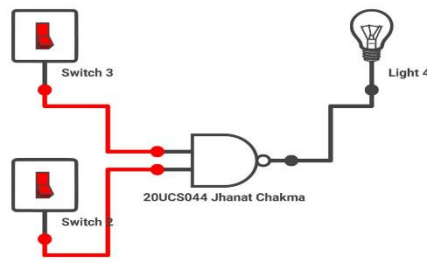
TRUTH TABLE

A	B	$\overline{A.B}$
0	0	1
0	1	1
1	0	1
1	1	0

NOR GATE   Symbol:

A $\qquad$

B $\qquad$ $Y=\overline{A+B}$
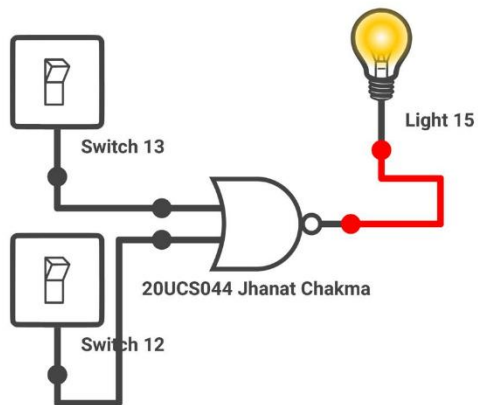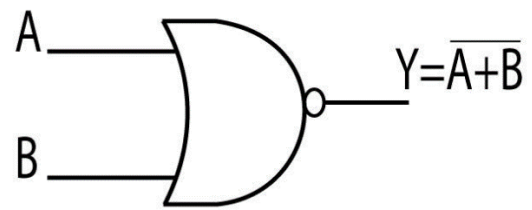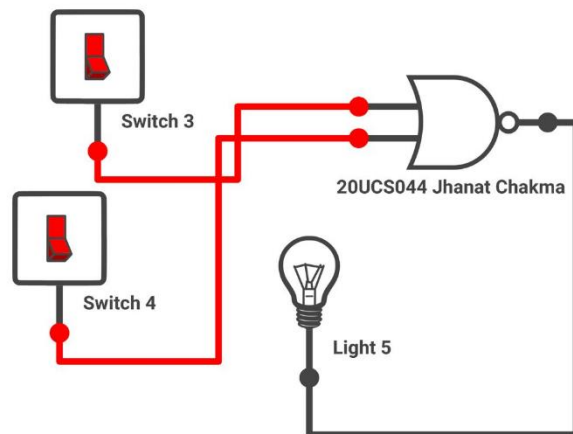
TRUTH TABLE:

A	B	$\overline{A + B}$
0	0	1
0	1	0
1	0	0
1	1	0

CONCLUSION: The truth tables for various logic gates like AND, OR, NAND, NOT, X-OR, NOR are verified.