EC0319 : Digital Electronics Date:_____

PRACTICAL-1

AIM: To Verify the Behavior of Logic Gates using Truth Table and Familiarization with Digital Integrated Circuits

- To verify the behaviour of logic gates using truth table and familiarization with digital integrated circuits:
- A logic gate is a digital gate that allows data to be manipulated. It is used to determine whether or not to pass a signal. Logic gates, on the other hand, govern the flow of information based on a set of rules.
- The logic gates can be classified into the following major types.

i). Basic Logic gates

a). AND Gate
b). OR Gate
c). NOT Gate

ii). Universal Logic gates

a). NOR Gate
b). NAND Gate

iii). Derived Logic gates

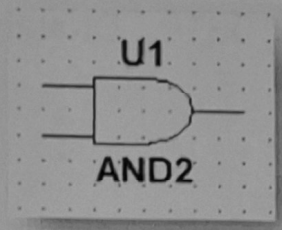
a). XOR Gate
b). XNOR Gate

- Let us now discuss each of these types of logic gates in detail one-by-one with its Boolean expression, Truth Table and Logic diagram.

i). AND Gate :-

$y = A \cdot B$

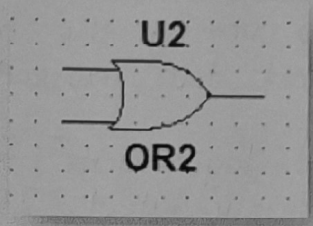
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1



ii). OR Gate :-

$y = A + B$

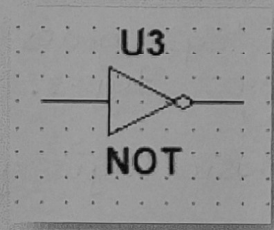
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1



iii). NOT Gate :-

$y = \bar{A}$

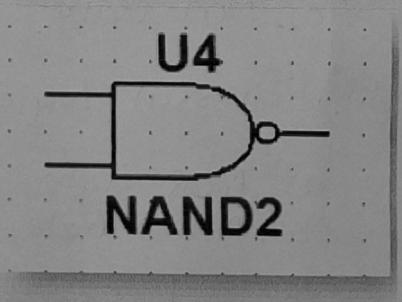
A	B	Y
0	-	1
1	-	0



iv). NAND Gate :-

$y = \overline{A \cdot B}$

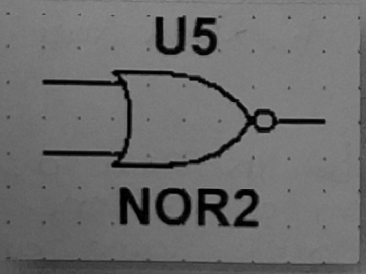
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	1



v). NOR Gate :-

$y = \overline{A+B}$

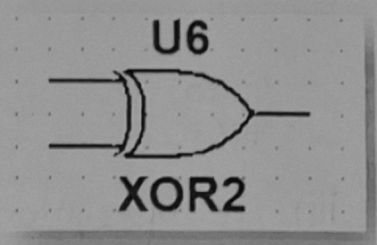
A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0



vi). XOR Gate :-

$$y = A \oplus B$$

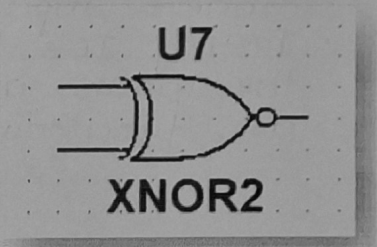
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0



vii). XNOR Gate :-

$$y = \overline{(A \oplus B)}$$

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1



- Digital integrated circuits (ICs) are used to implement logic gates and other digital functions in a compact form. Here's a basic guide to understanding digital ICs :

i). IC Packages and Pins :-

- Integrated circuits come in various packages such as DIP, SOIC, and QFP.
- Each IC has pins that correspond to the inputs and outputs of the internal logic gates.

ii). Common Logic gate ICs :-

- 7400
- 7404
- 7408
- 7432
- 7402
- 7486
- 4000
- 4011
- 4001

- 4040
- 4060

iii). IC Operation and Testing :-

- Connecting IC's are typically connected to a breadboard or PCB with proper wiring to provide power and connect inputs/outputs.
- Testing IC's use a logic probe or multimeter to test the inputs and outputs of IC's to ensure they are functioning correctly.

Conclusion :-

- In these experiment, we had learned about the behaviour of logic gates designing, wire, and operate logic gates such as AND, OR, NOT, NOR, NAND etc. It helps to understand how to implement simple circuits based on a schematic diagram using logic gates in multisim software and also learned about Integrated circuits (ICs) used to implement logic gates and other digital functions in a compact form.