Experiment No. 01:

Name of the Experiment:

To verify the Behavior of Logic Gates using Truth Table and familiarization with Digital Integrated Circuits.

Objective:

Verification and interpretation of truth tables for AND, OR, NOT, NAND, NOR Exclusive OR (EX-OR), Exclusive NOR (EX-NOR) Gates.

Theory:

Logic gates are electronic circuits which perform logical functions on one or more inputs to produce one output. There are seven logic gates. When all the input combinations of a logic gate are written in a series and their corresponding outputs written along them, then this input/ output combination is called Truth Table. OR, AND, NOT are basic gates. NAND, NOR are known as universal gates. Various gates and their working is explained here.

Required equipment and devices:

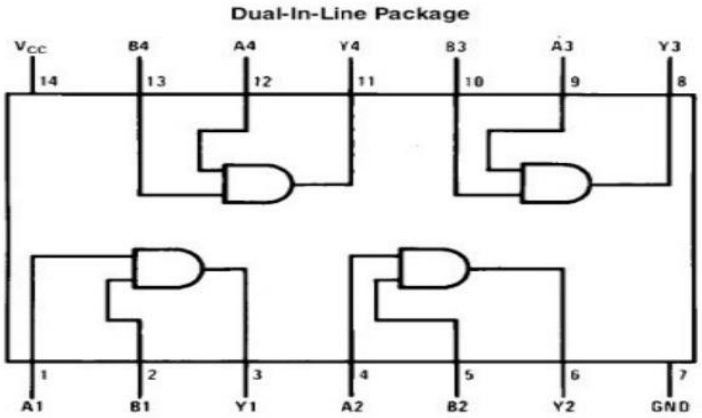
SL No.	COMPONENT	SPECIFICATION	QTY
1.	AND GATE	IC 7408	1
2.	OR GATE	IC 7432	1
3.	NOT GATE	IC 7404	1
4.	NAND GATE 2 I/P	IC 7400	1
5.	NOR GATE	IC 7402	1
6.	X-OR GATEIC 7408	IC 7486	1

BASIC GATES:

1. 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.

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

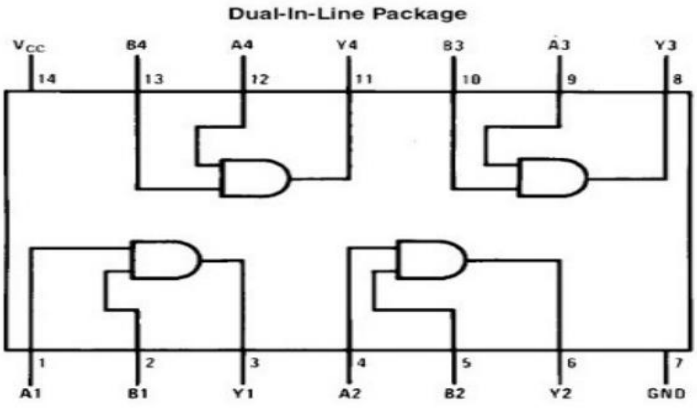


IC 7408

2. 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.

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

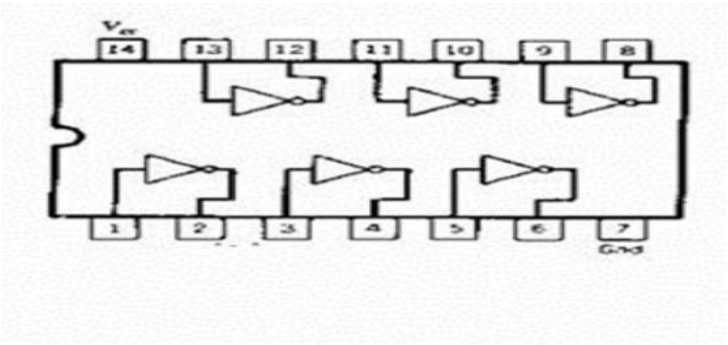


IC 7432

3. 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.

Input	Output
0	1
1	0



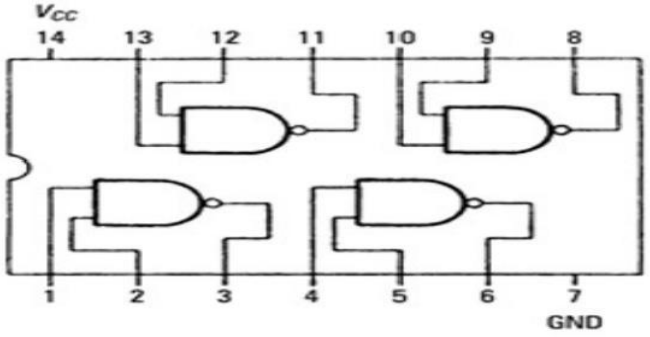
IC 7404

UNIVERSAL GATES:

1. 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.

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

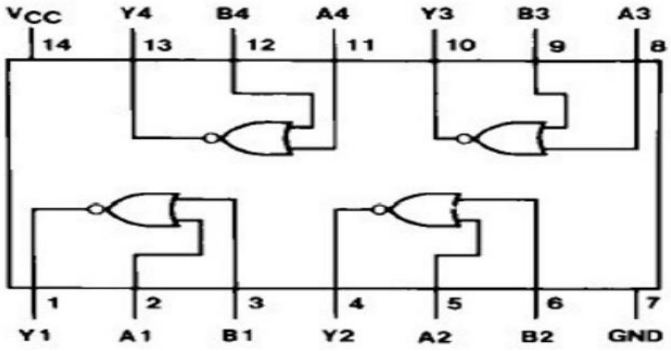


IC 7400

2. 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.

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



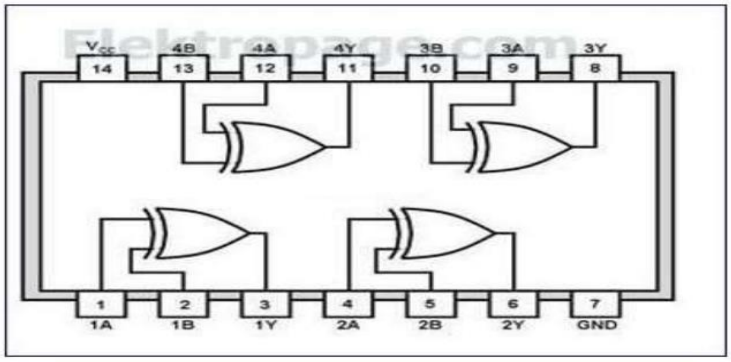
IC 7402

ADVACED GATES:

1. 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.

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



IC 74136

PROCEDURE:

1. Connect the trainer kit to ac power supply.
2. Connect the inputs of any one logic gate to the logic sources and its output to the logic indicator.
3. Apply various input combinations and observe output for each one.
4. Verify the truth table for each input/ output combination.
5. Repeat the process for all other logic gates.
6. Switch off the ac power supply.

CONCLUSION:

According to objective of this experiment, each expectation met successfully. Logic circuit design by using NOT, AND and OR gate was learnt successfully. Also, application of digital logic circuit design was investigated and proofed which show that logic gates used mostly in making automatic machine whereby the designer can set the conditions per user requirement or needs. The truth table and logic circuits diagram were used to build up the connection of all gates successfully.