Experiment – 1

Aim of the experiment: -

To study the logic behaviour of AND, OR, NOT, Ex-OR, Ex-NOR gate by using respective IC's.

Objectives: -

1.To verify all the gate by truth table.

2.To identify all the gate by their symbol and pin diagram.

3.To measure the output voltage.

Apparatus required: -

Serial no.	Items required	Specification
1.	Breadboard	
2.	IC's	
3.	AND gate (7408)	Quad 2 input AND gate
4.	OR gate (7432)	Quad 2 input OR gate
5.	NOT gate (7404)	Hex inverter
6.	NAND gate (7400)	Quad 2 input NAND gate
7.	NOR gate (7402)	Quad 2 input NOR gate
8.	Ex-OR gate (7486)	Quad 2 input Ex-OR gate
9.	Ex-NOR gate (74266)	Quad 2 input Ex-NOR gate
10.	Resistor	1.5 k-ohm
11.	Multi-meter	Digital type
12.	Connecting wires	

THEORY: -

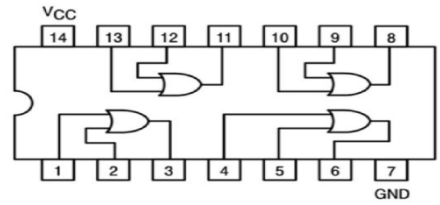
Integrated circuit (IC's) is an electronic circuit having many component circuit such as transistors, diodes, resistors & capacitors in a single package tip which is also convenient for laboratory and prototype work as it can also be interval easily into a breadboard a type of IC with two parallel rows of pins for the various circuit input and output.

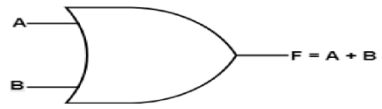
The outline of 14 pin tip is shown, there is a match on or end to show the orientations of the pins number counter clockwise from that point. Logic gates come in package containing several gates grouping available in dip package which are six-1 input gates, four-2 input gates, three input gates or two-4 input gates, although other arrangements are available. The usual way of starting the number or logic gate in a package into use the numerical prefix hex(6), quad or quadrable(4), triple(3) or dual(2).

Logic tables :-

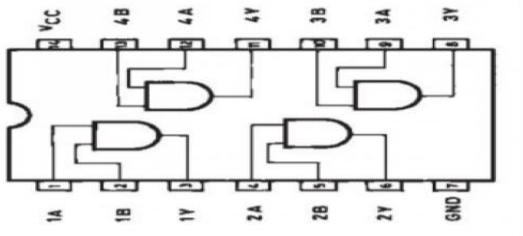
1.**OR gate** – It performs logic addition. It has two inputs and one output.

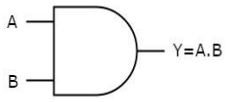
2.**AND gate** – It performs logic multiplication and it has also two inputs and one output.





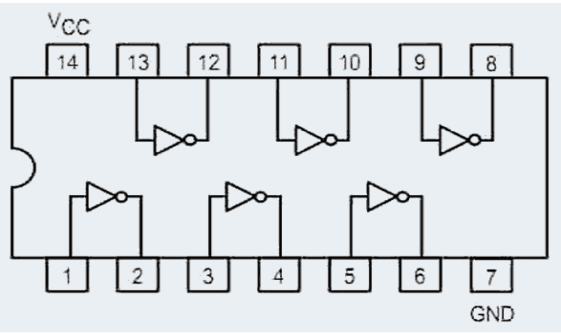
INPUT		OUTPUT
A	B	Y=A+B
0	0	0
0	1	1
1	0	1
1	1	1

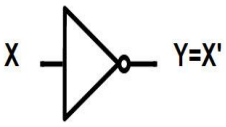




INPUT		OUTPUT
A	B	Y=A·B
0	0	0
0	1	0
1	0	0
1	1	1

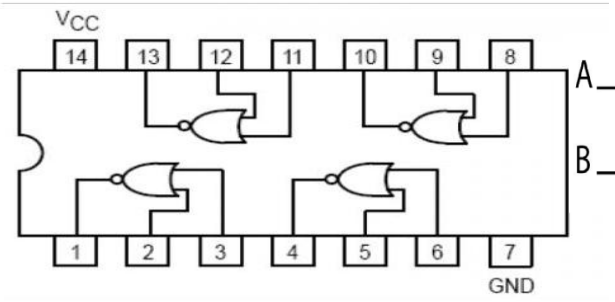
3.**NOT gate**- It performs a basic logic function called inversion or complementation. This gate has only 1 input and 1 output.

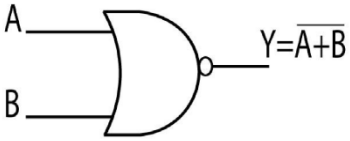




INPUT	OUTPUT
A	Y=A’
0	1
1	0

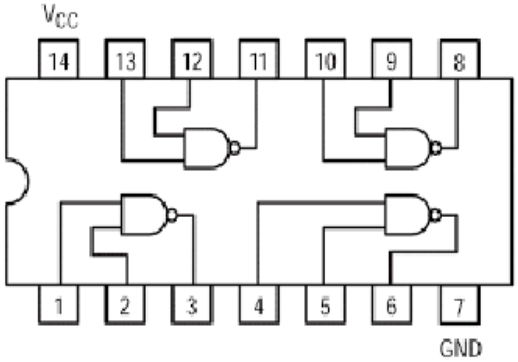
4.**NOR gate**- Here the output is high when the both inputs are low. It has two inputs and one output.

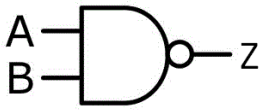




INPUT		OUTPUT
A	B	Y=(A+B)’
0	0	1
0	1	0
1	0	0
1	1	0

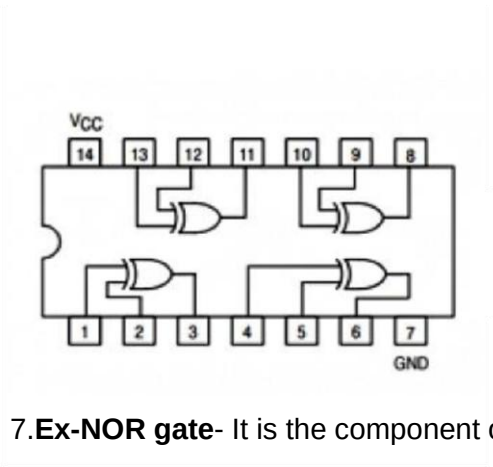
5.**NAND gate**- Here the output is low when both inputs are high. It has two inputs and one output.

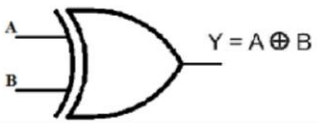




INPUT		OUTPUT
A	B	Y= (A·B)'
0	0	1
0	1	1
1	0	1
1	1	0

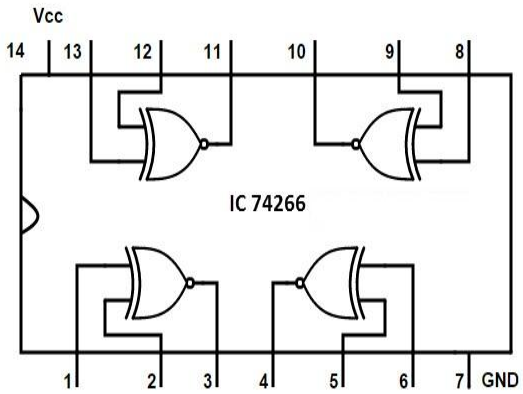
6.**Ex-OR gate**- This gate will produce high output when the inputs have odd no. of 1's. It has minimum two inputs.

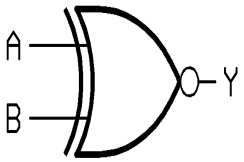




INPUTS		OUTPUTS
A	B	Y = A ⊕ B
0	0	0
0	1	1
1	0	1
1	1	0

7.**Ex-NOR gate**- It is the component of Ex-OR gate. It has minimum two inputs.





INPUT		OUTPUT
A	B	Y=A⊙B
0	0	1
0	1	0
1	0	0
1	1	1

PROCEDURE: -

1. The IC's (OR gate, AND gate, NOT gate, NOR gate, NAND gate, Ex-OR gate, Ex-NOR gate) were taken.
2. All the IC's were inserted in the bread board and their specification were rated down.
3. A voltage supply (5v) was given to 14 pin and always 7 no. pin was grounded. These were fixed together as the gates won't work without these corrections.
4. If the power supply is connected to the logic input as a logic high, the light glows. If the light doesn't glow, then it gives output as a logic low.
5. Output voltage was measured by voltmeter.

OBSERVATION: -

Write all the logic tables in high and low format with measured output voltage.

CONCLUSION: -

Hence the truth table of different gates were verified by using the IC's on bread board by measuring their voltages.