SE: SEM-III **Subject: DLCA**

EXPERIMENT 1

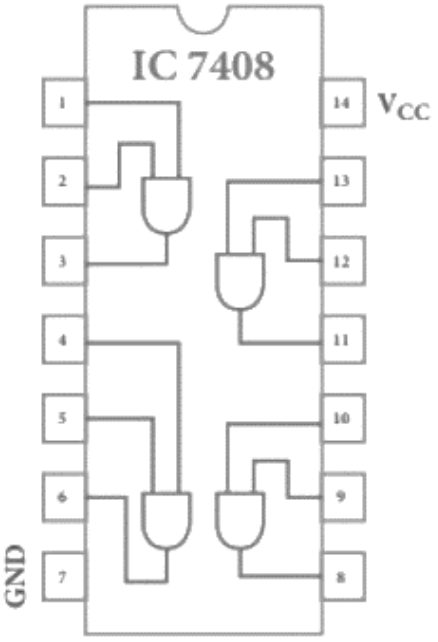
Aim: To apply the fundamentals of the digital logic for verifying the truth tables of logic gates

Apparatus: Power Supply, Breadboard, Connecting wires

Components: AND gate (IC 7408), NOT gate (IC 7404), OR gate (IC 7432), NAND gate (IC 7400), NOR gate (IC 7402), X-OR gate (IC 7486)

1) **AND Gate:**

PIN DIAGRAM-IC 7408



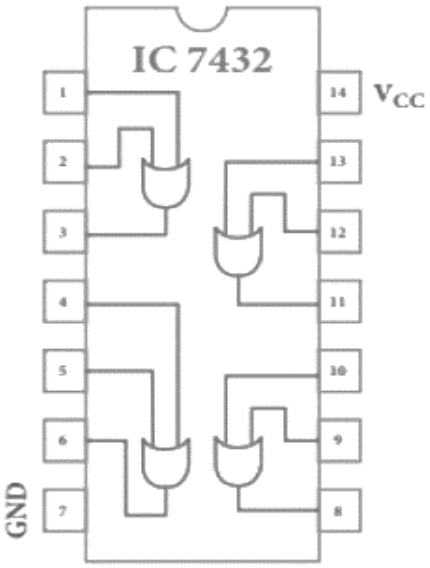
SYMBOL

TRUTH TABLE

A	B	Y=AB
0	0	0
0	1	0
1	0	0
1	1	1

2) OR Gate:

PIN DIAGRAM-IC 7432



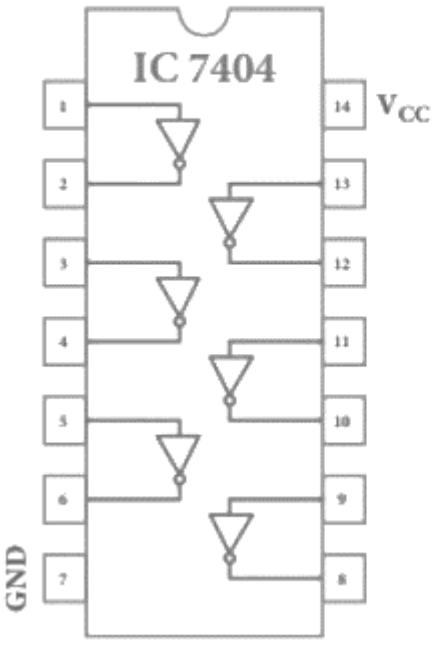
SYMBOL

TRUTH TABLE

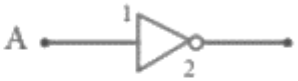
A	B	Y=A+B
0	0	0
0	1	1
1	0	1
1	1	1

3) NOT Gate:

PIN DIAGRAM-IC 7404



SYMBOL

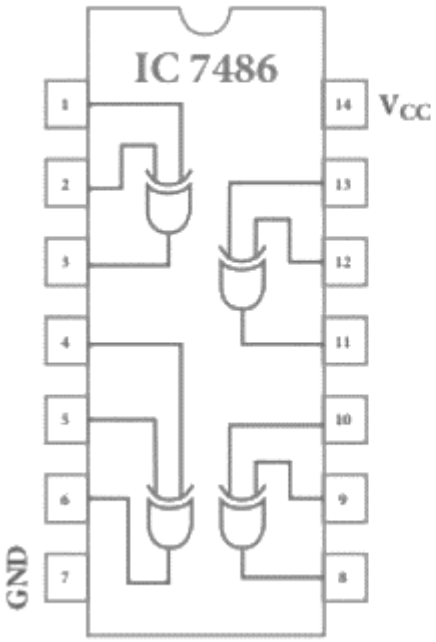


TRUTH TABLE

A	$Y=\bar{A}$
0	1
1	0

4) XOR Gate:

PIN DIAGRAM-IC 7486



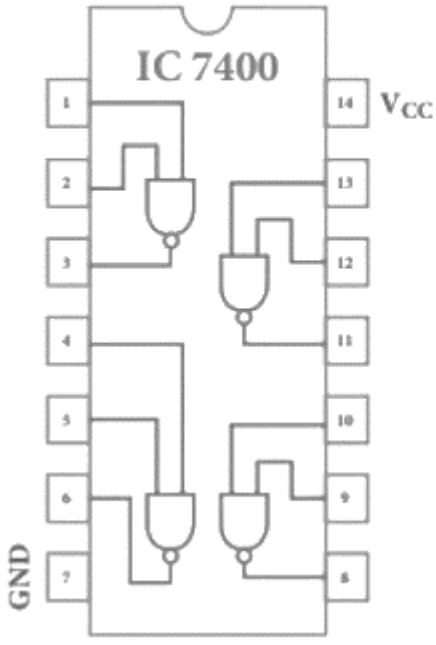
SYMBOL

TRUTH TABLE

A	B	$Y=\bar{A}B+A\bar{B}$
0	0	0
0	1	1
1	0	1
1	1	0

5) NAND Gate:

PIN DIAGRAM-IC 7400



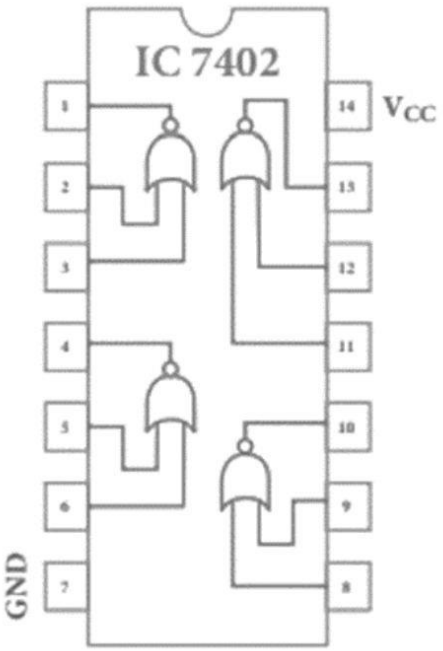
SYMBOL

TRUTH TABLE

A	B	$Y=\overline{AB}$
0	0	1
0	1	1
1	0	1
1	1	0

6) NOR Gate:

PIN DIAGRAM-IC 7402



SYMBOL

TRUTH TABLE

Inputs		Output
A	B	$Y=\overline{A+B}$
0	0	1
0	1	0
1	0	0
1	1	0

Theory:

Logic gates are the digital circuits with one output and one or more inputs. They are the basic building blocks of any logic circuit. Different logic gates are: AND, OR, NOT, NAND, NOR, EX- OR. They work according to certain logic.

AND: Logic eqn. Y = A.B

The output of AND gate is true when the inputs A and B are True.

OR: Logic eqn. Y = A+B.

The output of OR gate is true when one of the inputs A and B or both the inputs are true.

NOT: Logic eqn. $Y=\bar{A}$.

The output of NOT gate is complement of the input.

NAND: Logic eqn. $Y=\overline{A.B}$

The output of NAND gate is true when one of the inputs or both the inputs are low level.

NOR: Logical eqn. $Y=\overline{A+B}$.

The output of NOR gate is true when both the inputs are low.

EX-OR: Logic eqn. $Y=\overline{A}B+A\overline{B}$.

The output of EX-OR gate is true when both the inputs are low.

Procedure:

- To verify the truth table of a logic gate, the suitable IC is taken and the connections are given using the circuit diagram.
- For all the ICs, 5V is applied to the pin 14 while the pin 7 is connected to the ground.
- The logical inputs of the truth table are applied and the corresponding output is noted.
- Similarly, the output is noted for all other combinations of inputs.
- In this way, the truth table of a logic gate is verified.

Conclusion: