

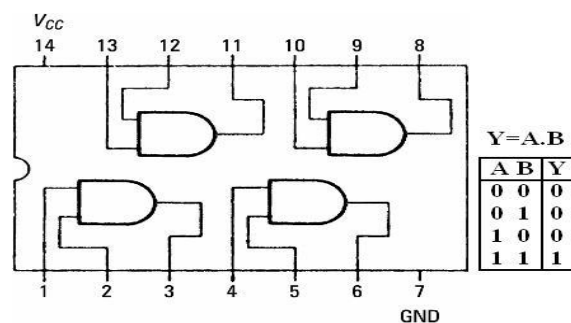
Experiment No.-1

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

Apparatus: Logic trainer kit, logic gates / ICs, wires.

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**. Various gates and their working are explained here.

AND Gate: AND gate produces an output as 1, when all its inputs are 1; otherwise the output is 0. This gate can have minimum 2 inputs but output is always one. Its output is 0 when any input is 0.

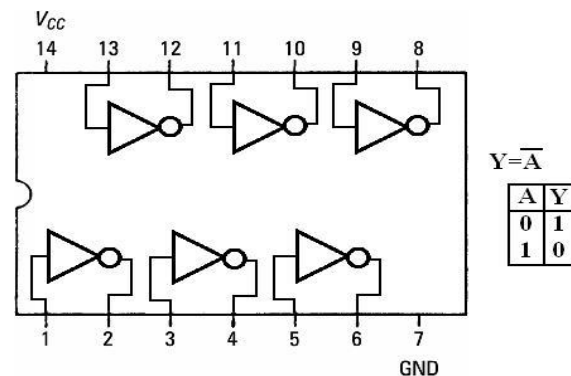


IC-7408

OR Gate: OR gate produces an output as 1, when any or all its inputs are 1; otherwise the output is 0. This gate can have minimum 2 inputs but output is always one. Its output is 0 when all input are 0.

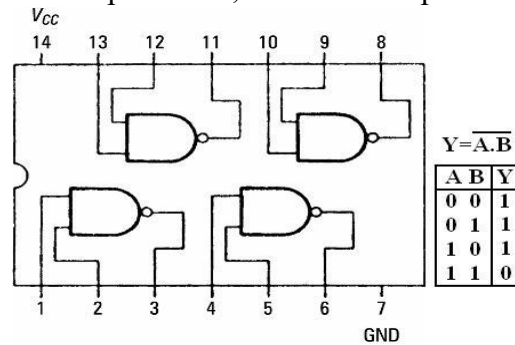
IC-7432

NOT Gate: NOT gate produces the complement of its input. This gate is also called an INVERTER. It always has one input and one output. Its output is 0 when input is 1.



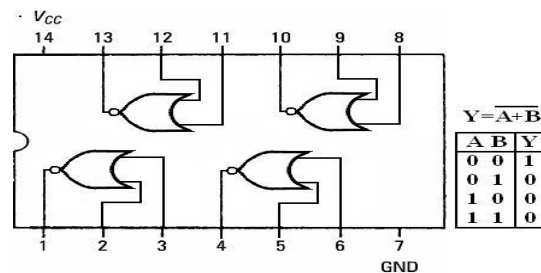
IC 7404

NAND Gate: NAND gate is actually a series of AND gate with NOT gate. If we connect the output of an AND gate to the input of a NOT gate, this combination will work as NOT-AND or NAND gate. Its output is 1 when any or all inputs are 0, otherwise output is 1.



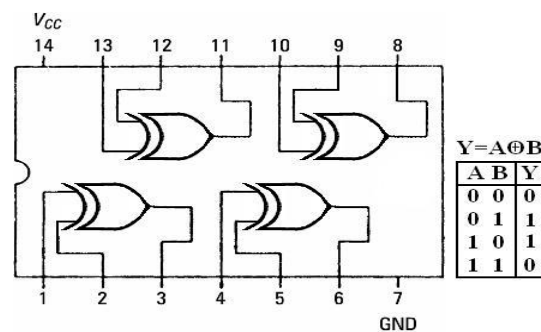
IC-7400

NOR Gate NOR gate is actually a series of OR gate with NOT gate. If we connect the output of an OR gate to the input of a NOT gate, this combination will work as NOT-OR or NOR gate. Its output is 0 when any or all inputs are 1, otherwise output is 1.



IC-7402

Exclusive OR (X-OR) Gate:- X-OR gate produces an output as 1, when number of 1's at its inputs is odd, otherwise output is 0. It has two inputs and one output.



IC7486

Procedure:

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