# EXPERIMENT NO.: - 1

# AIM: To study the basic logic gates which are used in digital circuits

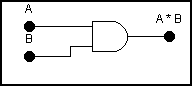
# THEORY:

Any Gate is a logic circuit with one output and one or more inputs. The output signal of any gate occurs only for certain combination of input signals. Different types of gates are used in the digital circuit like AND gate, OR gate, NOR gate, NAND gate, NOT gate are the basic logic gates. Some gates are the combination of above basic gates. Such gates can be prepared by using discrete components like diodes, transistors, and resisters but nowadays, different ICs are used to have different gates. A power supply of +5 V is used to give input. This supply is also used to drive ICs. When power supply to the input is 'ON' we can say that logic level is at '1' and when power supply to the input is 'OFF' the logic level is said to be at '0' level.

**AND GATE:**

AND gate is a gate which gives output (output at '1' level) only when all inputs are present (i.e. all inputs are at '1' level). Here IC 7408 is used which has 2-inputs AND gate which are four in numbers. Here only one gate is used. The truth table of AND gate is given in the table.

|  |  |  |
| --- | --- | --- |
| **A** | B | OUTPUT |
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

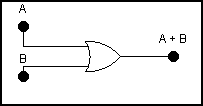


**Practical Figure:**

**OR GATE**:

OR gate is a gate which gives output (output at '1' level) when any ONE of the input is present (any ONE out of all input must be at '1' level). Here IC 7432 is used which has two input OR gates which are four in numbers. The truth table of OR gate is given in the table.

|  |  |  |
| --- | --- | --- |
| **A** | B | OUTPUT |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

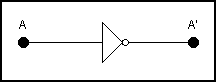


**Practical Figure:**

**NOT GATE:**

This is also known as INVERTER gate. This gate has one input and one output. All it does is invert the input signal i.e. if the input is at high level, the output will be at low level and vice versa. ICs 7404 or 7406 can be used to get NOT gates, which are six in numbers. The truth table of NOT gate is given in the table.

|  |  |
| --- | --- |
| A | OUTPUT |
| 0 | 1 |
| 1 | 0 |



**Practical Figure:**

**EQUIPMENTS REQUIRED:**

Trainer kit orBread Board, Power Supply and LEDs.

**COMPONENTS REQUIRED:**

**-**ICs **7408, 7432, 7404**.

**-**Hook up wires.

**PROCEDURE:**

1. Pull all switches at ‘0’ position.
2. Switch ON the power supply.
3. Test the truth table of different gates by changing the position of inputs (i.e. ‘1’ level means switch is ON & ‘0’ level means switch is OFF) and check the level of output (if LED glows it is at level ‘1’ and if LED doesn’t glow output is at level ‘0’).

**OBSERVATIONS:**

**CONCLUSION:**