Experiment No. Date: ……/…… /…....

TO DESIGN LOGIC GATES USING DIODES AND VERIFY THE TRUTH TABLES OF (I) OR GATE (II) AND GATE.

APPARATUS REQUIRED:

1. PN junction diodes
2. A light emitting diode (LED)
3. Battery- DC power supply $[2V]$
4. Bread board
5. Connecting wires
6. Jumpers
7. Resistors $(\sim 1K\Omega)$

THEORY:

The logic gates are the electronic circuits which give the logic decisions. A logic gate is a semiconductor device which performs logical operation on one or more binary inputs and produces a single binary output. Logic gates are built using diodes or transistors acting as electronic switches.

Boolean algebra:

Boolean algebra is a branch of mathematics that deals with operations on logical values with binary variables. The Boolean variables are represented as binary numbers to represent truths:

$\mathbf{1} = \boldsymbol{true}\ (\boldsymbol{on}\ ;\ \boldsymbol{high})$ and

$\mathbf{0} = \boldsymbol{false}\ (\boldsymbol{off}\ ;\ \boldsymbol{low})$.

Elementary algebra deals with numerical operations whereas Boolean algebra deals with logical operations.

Truth table:

A truth table is a mathematical table used in logical analysis. A truth table has one or more columns for each input variable and one final column showing all possible results based on the relation.

OR gate:

The logic gate which gives high output when any of the inputs is high is called as OR gate.

Symbol:

An OR can have two or more inputs and a single output. However, in most of the cases, it has two inputs.

The symbol of OR gate is:

Fig. (a): Symbol of OR gate

Boolean Algebra:

If A and B are two inputs of OR gate, then the Output (Y) is given by:

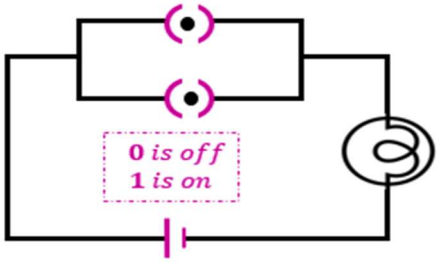
$$Y = A + B$$

Truth table:

Inputs		*Output*
A	B	$Y = A + B$
0	0	0
0	1	1
1	0	1
1	1	1

Fig. (b): Truth table of OR gate

Circuit Representation:



Circuit Representation of OR gate