

## Experiment : LOGIC GATES

**Object :** To verify the truth table of basic gate (NOT, AND, OR) and universal gates (NAND and NOR) using RTL (using Resistor Transistor Logic)/ DTL (Diode Transistor Logic) circuits.

**Apparatus used:** Resistor, diode, transistor, LED, 5-volt power supply, IC and connecting wires.

Formula and circuit diagram:

[1] NOT Gate :  $Y = \bar{A}$

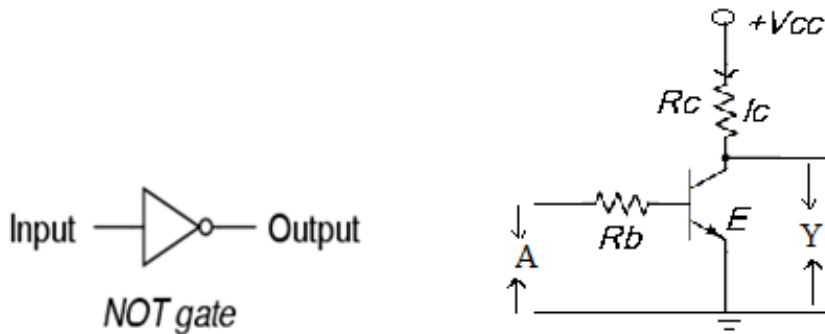


Figure 1: RTL as NOT gate

[2] AND Gate :  $Y = A \cdot B$

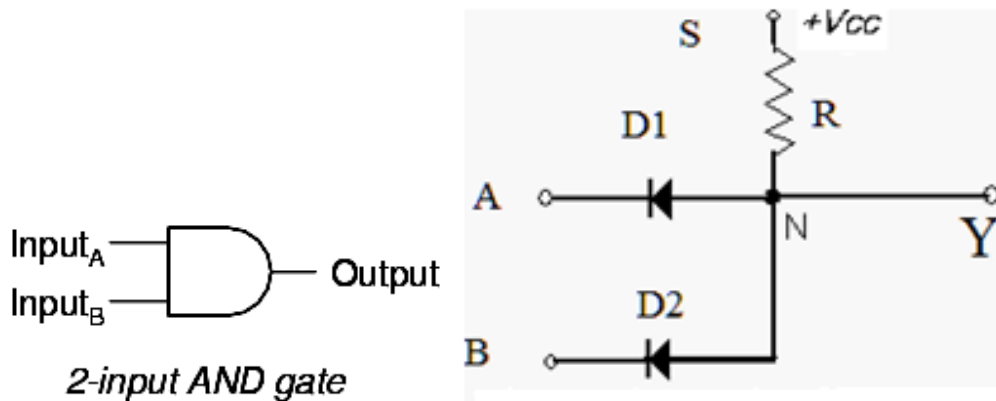


Figure 2: Diode circuit as AND gate

[3] OR Gate :  $Y = A + B$

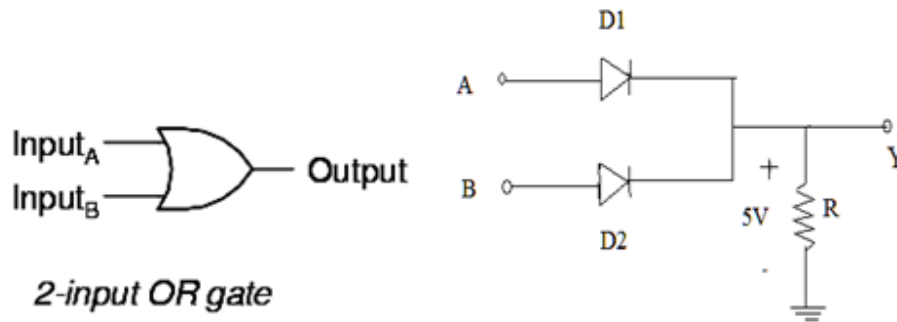


Figure 3: Diode circuit as OR gate

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[4] NAND Gate :  $Y = \overline{A \cdot B}$

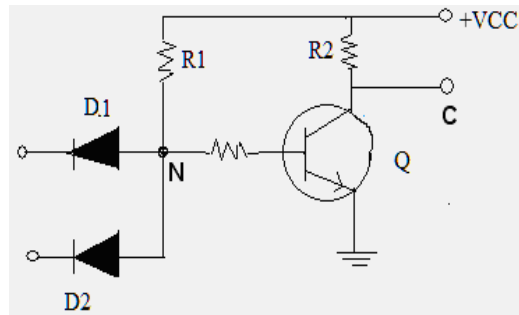
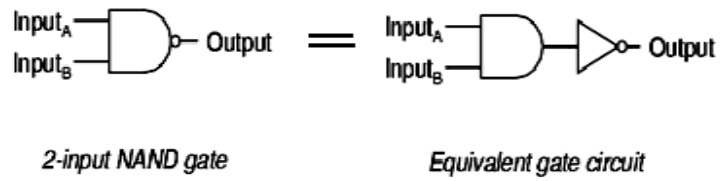


Figure 4: DTL as NAND Gate

[5] NOR Gate:  $Y = \overline{A + B}$

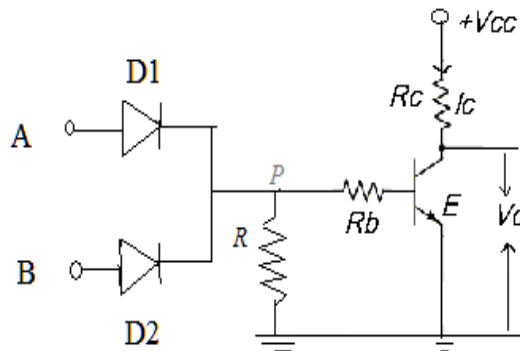
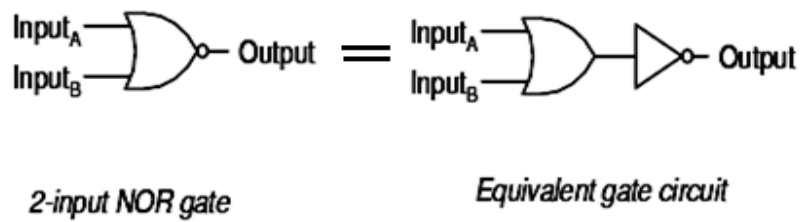


Figure 5: DTL as NOR Gate

**Observation :**

1. Truth Table for NOT gate

A	$\overline{A}$
0	1
1	0

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### 2. Truth Table for AND gate

A	B	A.B
0	0	0
0	1	0
1	0	0
1	1	1

### 3. Truth Table for OR gate

A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1

### 4. Truth Table for NAND gate

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

### 5. Truth Table for NOR gate

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

**RESULT:** The truth table for basic logic gates are verified.

**Precaution:**

1. Input must be off 5 volts.
2. Connections should be jointed correctly.
3. Connections must be tight.