

# EXPERIMENT NO-1

## 1. AIM OF THE EXPERIMENT: -

To study about different electronic components and devices.

## 2. OBJECTIVE: -

Familiarization of electronic components such as Resistor, Capacitor, Bread board, LEDs, ICs, Diode, Transistors etc.

Testing and measurement of component values using digital multi meter.

## 3. COMPONENTS REQUIRED: -

Digital Multi Meter

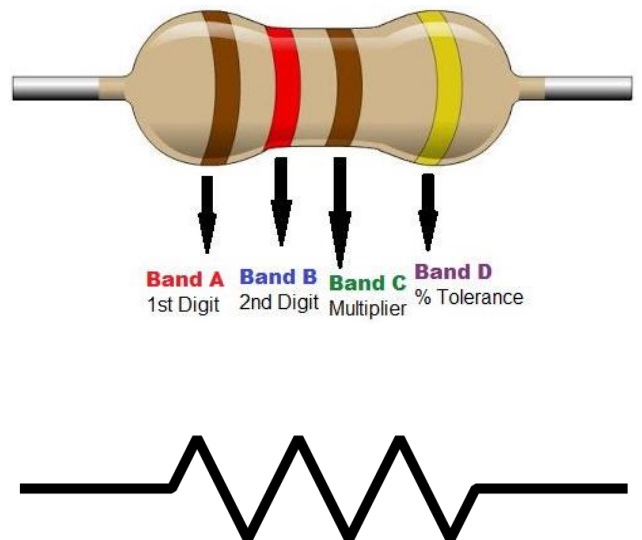
Different Component

## 4. THEORY: -

### 4.1. RESISTOR: -

Most axial resistors use a pattern of colored strips to indicate resistance. A “4 Band” identification is the most commonly used color coding scheme on all resistors. It consists of four color bands that are painted around the body of the resistor. Resistor values are always coded in “Ohms” ( $\Omega$ ).

| Color  | Digit | Multiplier | Tolerance (%) |
|--------|-------|------------|---------------|
| Black  | 0     | $10^0$ (1) |               |
| Brown  | 1     | $10^1$     | 1             |
| Red    | 2     | $10^2$     | 2             |
| Orange | 3     | $10^3$     |               |
| Yellow | 4     | $10^4$     |               |
| Green  | 5     | $10^5$     | 0.5           |
| Blue   | 6     | $10^6$     | 0.25          |
| Violet | 7     | $10^7$     | 0.1           |
| Grey   | 8     | $10^8$     |               |
| White  | 9     | $10^9$     |               |
| Gold   |       | $10^{-1}$  | 5             |
| Silver |       | $10^{-2}$  | 10            |
| (none) |       |            | 20            |



## 4.2. CAPACITOR: -

A capacitor is a device which stores electrical charge. A basic capacitor has two parallel plates separated by an insulating material.

The unit of capacitor is “Farad” (F).

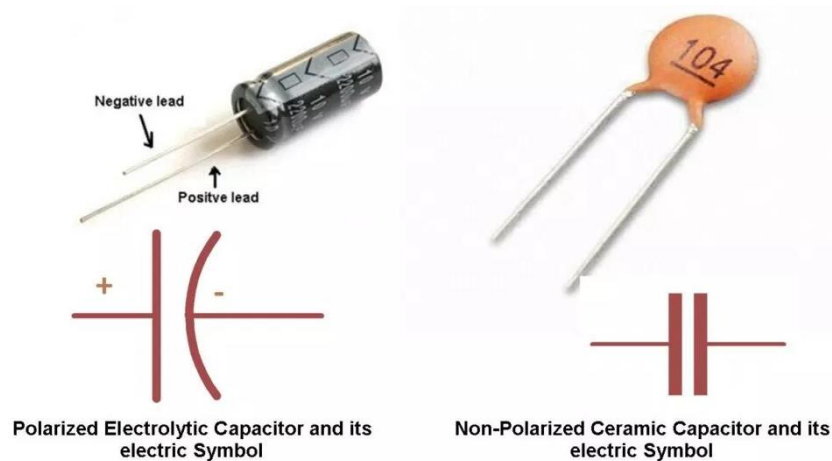
Capacitance values are normally smaller such as  $\mu\text{f}$ ,  $\text{nf}$ ,  $\text{pf}$ .

### 4.2.1. ELECTROLYTIC CAPACITOR: -

An electrolytic capacitor is a type of capacitor that uses an electrolytic, an ionic conducting liquid, as one of its plates, to achieve a larger capacitance per unit volume than other types. They are used in relatively high current and low frequency electrical circuits.

### 4.2.2. CERAMIC CAPACITOR: -

These capacitors are generally non polarized and almost as common as radial electrolyte capacitors. Generally, they use an alpha numeric marketing system. The number of part is the same as resistor except that the value represented is in  $\text{pf}$ . They may also be written out directly for instance  $2\text{n}2 = 2.2\text{nf}$ .

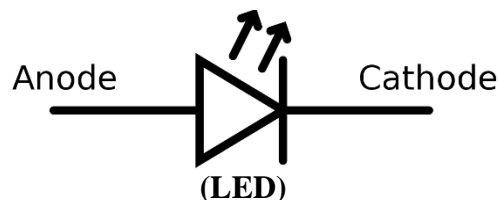


## 4.3.BREAD BOARD: -

A bread board is used to build and test circuits quickly before finalizing any circuit design. The bread board has many holes into which circuit components like ICs and Resistors can be inserted. A typical bread board.

## 4.4. LED: -

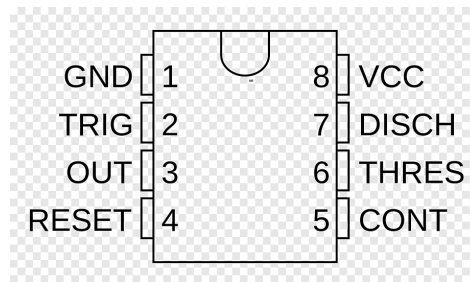
A light emitting diode (LED) is a semiconductor device that emits light when an electric current is passed through it. Light is produced when the particles that carry the current (known as electrons and holes) combine together within the semiconductor material.



#### 4.5. INTEGRATED CIRCUIT (IC): -

An integrated circuit (IC) is a small semiconductor based electronic device consisting of fabricated transistors, resistors and capacitors. Integrated circuits are the building blocks of most electronic devices and equipment.

An integrated circuit also known as chip or microchip.



**INTEGRATED CIRCUIT (IC)**

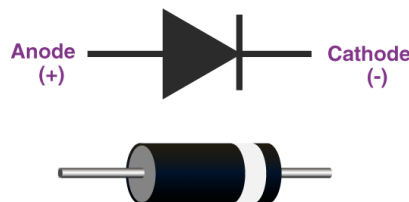
#### 4.6. DIODE: -

A diode is a specialized electronic component with two electrodes called the anode and the cathode.

Diodes are basic unidirectional semiconductor devices that will only allow current to flow through them in one direction only.

##### 4.6.1. SEMICONDUCTOR DIODE: -

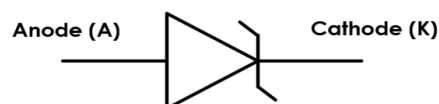
A p-n junction diode is a two terminal devices, which allows the electric current in only one direction which block the electric current in opposite or reverse direction. If the diode is forward biased, it allows the electric current flow on the other hand if the diode is reverse biased it blocks the electric current flows. P-N junction semiconductor device.



**(P-N Junction Diode)**

##### 4.6.2. ZENER DIODE: -

A heavily doped semiconductor diode which is designed to opposite in reverse direction is known as the Zener diode. In other words, the diode in which specially designed for optimizing the break down region is known as the Zener diode.



**Zener Diode**

#### 4.7. TRANSISTOR: -

A transistor is a semiconductor device used to amplify or switch electronic signals and electrical power. It is composed of semi conduction material usually with at least three terminals for connection to an external circuit.

The transistor has three terminals named as Emitter, Collector, and Base.

The Transistor is of two types: -

- (a). N-P-N type
- (b). P-N-P type

##### 4.7.1. N-P-N type: -

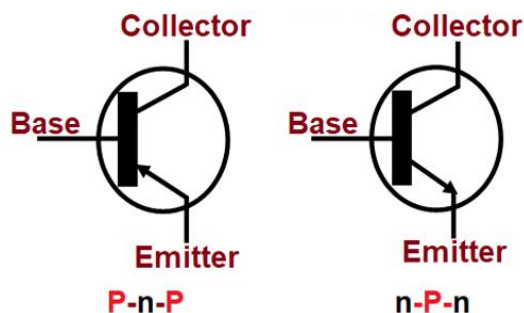
The transistor in which one P-type material is placed between two N-type materials is known as N-P-N transistor.

In N-P-N transistor the direction of movement of an electron is from the emitter to collector (current is from collector to emitter) region due to which the current constitutes in the transistor.

##### 4.7.2 P-N-P type: -

The transistor in which one N-type material is placed between two P-type materials is known as P-N-P transistor.

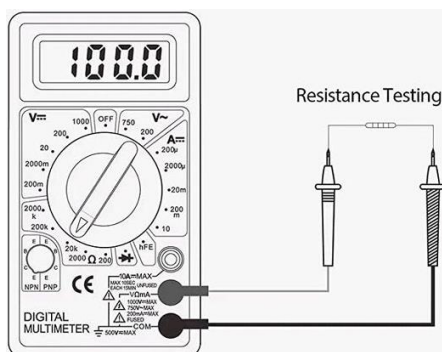
In P-N-P transistor the direction of movement of an electron is from the collector to emitter (current is from emitter to collector) region due to which the current constitutes in the transistor.



(TRANSISTOR)

#### 4.8. MULTIMETER: -

A digital Multi meter (DMM) is a test tool used to measure two or more electrical values principally voltage (volts), Current (amps) and resistance (ohms). It is a standard diagnostic tool for technicians in the electrical/electronic industries.



(MULTIMETER)

## 5. TABULATION

### RESISTOR: -

| Sl No | Colour of rings |   |   |   | True Value( $\Omega$ ) | Measured Value ( $\Omega$ ) | % of Error |
|-------|-----------------|---|---|---|------------------------|-----------------------------|------------|
|       | 1               | 2 | 3 | 4 |                        |                             |            |
| 1     |                 |   |   |   |                        |                             |            |
| 2     |                 |   |   |   |                        |                             |            |
| 3     |                 |   |   |   |                        |                             |            |
| 4     |                 |   |   |   |                        |                             |            |

### CAPACITOR: -

| Sl No | Type of Capacitor | True Value( $\mu\text{f}$ ) | Measured Value ( $\mu\text{f}$ ) |
|-------|-------------------|-----------------------------|----------------------------------|
| 1     |                   |                             |                                  |
| 2     |                   |                             |                                  |

### DIODE: -

| Sl No | Type of Diode | True Value | Measured Value |
|-------|---------------|------------|----------------|
| 1     |               |            |                |
| 2     |               |            |                |
| 3     |               |            |                |

### TRANSISTOR: -

| Sl No | Type of Transistor | Gain ( $\beta$ ) |
|-------|--------------------|------------------|
| 1     |                    |                  |
| 2     |                    |                  |

### CONCLUSION: -