

## Lab Experiment-2

### **Experiment Name:**

Study of Diode Characteristics.

#### **1) Objective:**

To study of diode characteristics in forward bias and reverse bias.

#### **2) Apparatus:**

- a) Bread Board
- b) Resistor
- c) Diode
- d) Multi-meter
- e) Connecting wire

#### **3) Theory:**

The simplest and most fundamental nonlinear circuit element is the diode. Diode is a bi-polar device that behaves as the short circuit when it is in forward bias and as an open circuit when it is in reverse bias condition.



**Figure 1.1 : Schematic Diagram of Diode.**



**Figure 1.2 : P - N Junction Diode .**

There are two types of biasing condition for a diode:

#### **Forward bias operation**

The P-N junction supports uni-directional current flow. If +ve terminal of the input supply is connected to P side and -ve terminal is connected the n side, then diode is said to be forward biased condition. In this condition the height of the potential barrier at the junction is lowered by an amount equal to given forward biasing voltage. Both the holes from p-side and electrons from

n-side cross the junction simultaneously thereby decreasing the depleted region. This constitutes a forward current.

### **Reverse bias operation**

If negative terminal of the input supply is connected to p-side and –ve terminal is connected to n-side then the diode is said to be reverse biased. In this condition an amount equal to reverse biasing voltage increases the height of the potential barrier at the junction. Both the holes on P-side and electrons on N-side tend to move away from the junction there by increasing the depleted region. However, the process cannot continue indefinitely, thus a small current called reverse saturation current continues to flow in the diode.

### **Data Tables:**

#### Forward bias

No	Vs(v)	Vd(v)	Id(ma)
1	0.3		
2	0.4		
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

### Reverse bias

No	Vs(v)	Vd(v)	Id(ma)
1	0.3		
2	0.4		
3			
4			
5			
6			
7			

**Graph:**

**Result:**

The V-I characteristics of junction diode in forward and reverse bias condition has been plotted on the graph

**Conclusion:**

This experiment focuses on the investigation of the basic characteristics of a diode. From the experiment, the following conclusions were drawn:

- The diode test is one of the foundations of electronics.
- It is in forward-biased when its resistance has a smaller value while it is in reverse-biased when its resistance has a larger value.
- The forward-biased voltage of diode is its barrier potential while the reverse-biased voltage of diode is infinite over range which shows that the diode is in healthy condition.
- This experiment proved that diode controls the direction of the current.
- In forward-biased the voltage of the power source overcame the voltage of the diode and there is a current flowing on the circuit.
- In reverse-biased there it is an open circuit and no current flowing.
- The voltage of the diode, voltage across the resistor and the current of diode are directly proportional to each other.
- In reverse-biased, there is no voltage across the resistor and there is no current on the diode when the voltage of the diode is equal or less than 0.
- In forward biased, there is a voltage on resistor and a current on the diode if the voltage of the diode is greater than 0.

**Problem and solutions:**

1. We may have to face some problems due to environment. We will ignore it.
2. While doing the experiment if we exceed the readings of the diode. Then it may lead to damaging of the diode. So, we have to be careful.
3. Wrong connections of resistance in breadboard will yield wrong readings. We have to be careful about it.

4. We have to connect multi-meter correctly to find the perfect reading.
5. We did not find any current in Reverse bias. We will ignore it.