



## Experiment No.1

### *Semiconductor diode characteristics*

#### **Object:**

To study the characteristics of the forward and reverse biased junction diodes.

#### **Apparatus:**

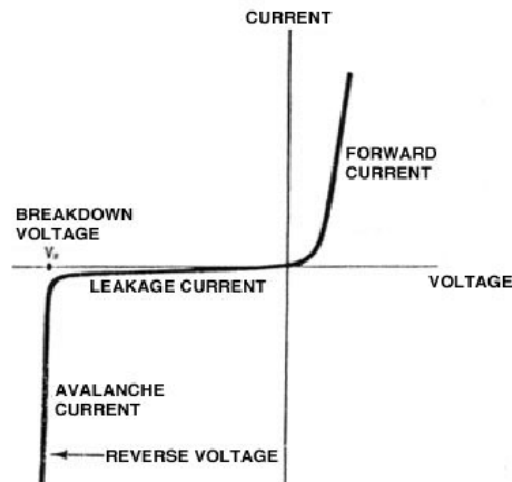
1. DC power supply.
2. Two AVOMeters.
3. Breadboard, Diode and  $1K\Omega$  Resistor.

#### **Theory:**

The general form of the current - voltage c/cs of a diode is shown in Figure (1). A current flow in the forward direction is very large compared with that in the reverse direction and such a device is very useful as a rectifier.

The diode is in the forward direction when an external battery is connected with positive

terminal to the (p) region and negative terminal to the region (n). The reverse current through the diode varies greatly with temperature and with the semiconductor material used.



*Figure (1) V-I c/cs of a real diode*



**Procedure:**

1. Connect the circuit as shown in Figure (2) using silicon diode.
2. Increase the variable DC voltage from zero in steps of (0.1 volts) up to (1 volts), then in step of (0.5 volt) up to (4 volt), and record the voltage across the (100 ohm) resistance ( $V_r$ ).
3. Tabulate your results in a table as shown in table (1).
4. Connect the circuit shown in Figure (3) using Si diode.
5. Increase the variable DC voltage from zero in steps of (0.2 volts) up to (1 volt), then in steps of (1 volt) up to (4 volts) and for each step record the current flowing in the circuit.
6. Tabulate your result in a table as shown in table (2).

**Note:**

For the reverse c/cs of (Si) diode the reverse current is very small compare with the current of (Ge) diode , so its assumed to be zero.

**Discussion:**

1. Compare between the Si & Ge diode? which is has the better forward c/cs?
2. What is the barrier field and how is it produce?
3. Comment on the results of the experiment.

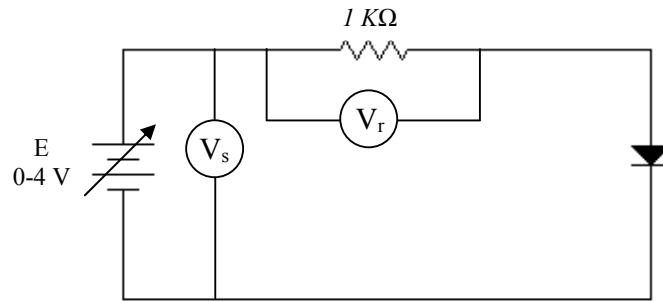
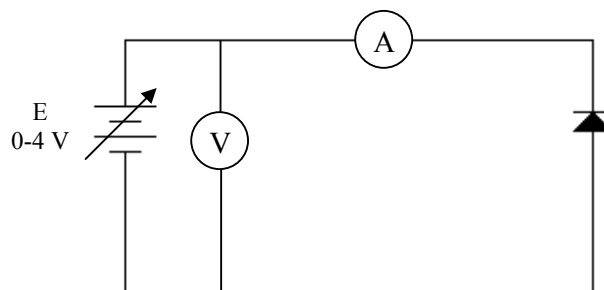


Figure (2) forward c/cs circuit

$V_s$ (Volt)	$V_r$ (Volt)	$V_f = V_s - V_r$ (Volt)	$I_f = V_r / r$ (mA)

Table (1)



Figure(3) Reverse c/cs circuit

$V_{reverse}$	$I_{reverse}$

Table (2)