Brac University
Department of Electrical & Electronic Engineering
Fall2025

Course Number : EEE205L

Section   :01

Group No   :01

Lab Report

Experiment no: | 01 |

Name of the experiment:

Semiconductor and Zener diode characteristics

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Objective:

The objective of this experiment is to study the voltagecurrent (VI) characteristics of a semiconductor diode and a Zener diode. This experiment helps us understand how a normal diode behaves in forward bias and how a Zener diode works in reverse bias. We also aim to find the knee voltage of the semiconductor diode and the Zener breakdown voltage from the graph. This experiment helps us learn the basic working principle and practical use of diodes in electronic circuits.
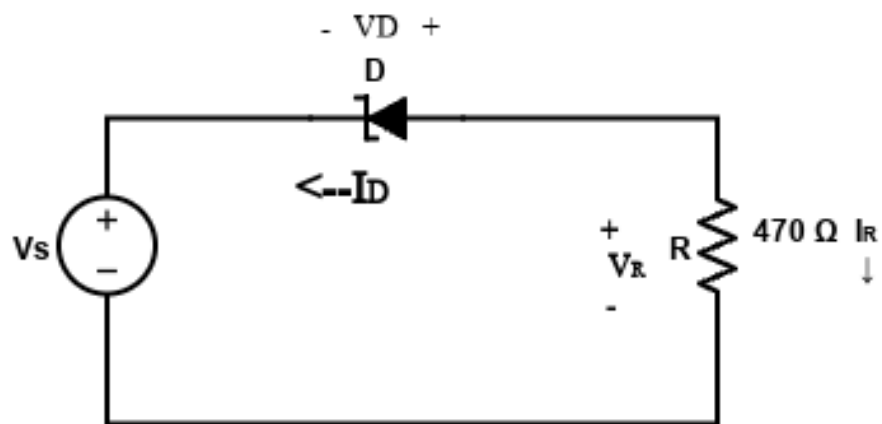
Equipments:

1.Breadboard

2. Jumper Wires

3. 1KΩ Resistors

4. 470Ω Resistors

5. Semiconductor diode

6. Zener diode

Circuit Diagram

Semiconductor diode circuit:
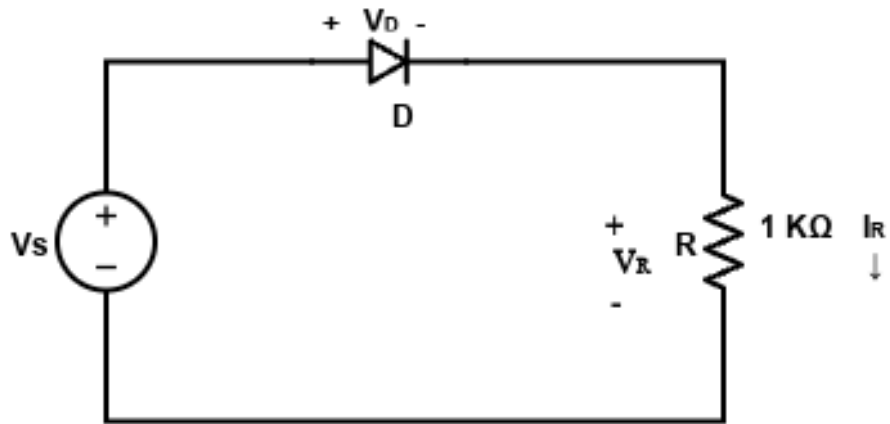
Zener diode circuit:

Data Table

	Semiconductor diode data				
R(kΩ)	V_S (V)	V_D (V)	V_R (V)	$I_R=V_R/R$ (mA)	$I_D=I_R$ (mA)
0.983	0	0	0	0	0
	0.103	0.103	0	0	0
	0.228	0.226	0	0	0
	0.33	0.323	0.006	0.0061	0.0061
	0.427	0.386	0.04	0.0407	0.0407
	0.549	0.423	0.1245	0.127	0.127
	0.667	0.442	0.225	0.23	0.23
	0.726	0.449	0.275	0.28	0.28
	0.850	0.462	0.388	0.395	0.395
	0.919	0.467	0.450	0.458	0.458
	1.034	0.476	0.556	0.560	0.566
	2.01	0.517	1.49	1.52	1.52
	3.00	0.542	2.46	2.502	2.502
	4.06	0.560	3.5	3.56	3.561
	4.99	0.573	4.42	4.50	4.50
	6.01	0.585	5.42	5.513	5.513
	7.07	0.595	6.44	6.551	6.551
	8.04	0.603	7.44	7.57	7.57
	9.04	0.611	8.43	8.576	8.576
	10.0	0.618	9.40	9.563	9.563

R(kΩ)	V_S (V)	V_D (V)	V_R (V)	$I_R=V_R/R$ (mA)	$I_D=-I_R$ (mA)
			Zener diode data		
0.468	0	0	0	0	0
	1.00	-1.00	0	0	0
	2.01	-2.01	0	0	0
	3.03	-3.02	0	0	0
	4.04	-4.03	0	0	0
	4.23	-4.22	0	0	0
	4.43	-4.42	0	0	0
	4.64	-4.62	0	0	0
	4.83	-4.80	0.015	0.032	-0.032
	5.04	-4.99	0.041	0.088	-0.088
	5.26	-5.13	0.121	0.259	-0.259
	5.47	-5.18	0.280	0.598	-0.598
	5.63	-5.20	0.423	0.903	-0.903
	5.85	-5.20	0.636	1.36	-1.36
	6.06	-5.21	0.844	1.803	-1.803
	7.00	-5.22	1.769	3.78	-3.78
	8.05	-5.23	2.81	6.004	-6.004
	9.05	-5.24	3.80	8.12	-8.12
	10.01	-5.23	4.75	10.149	-10.149

Graph:-
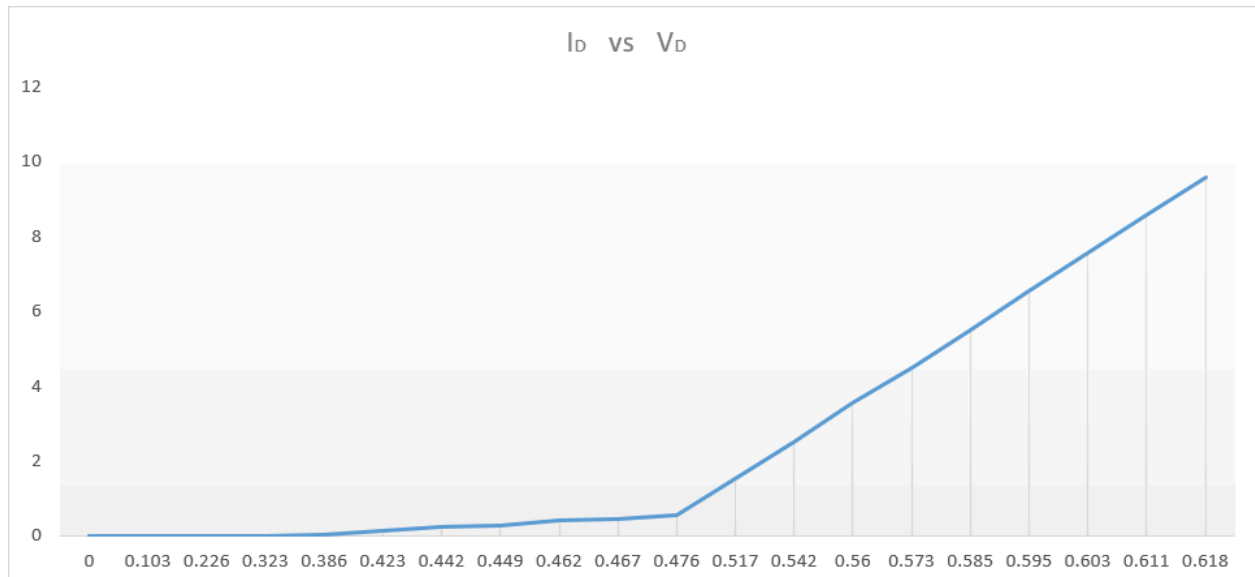
Figure 1:- Semiconductor diode graph (I_D vs V_D)
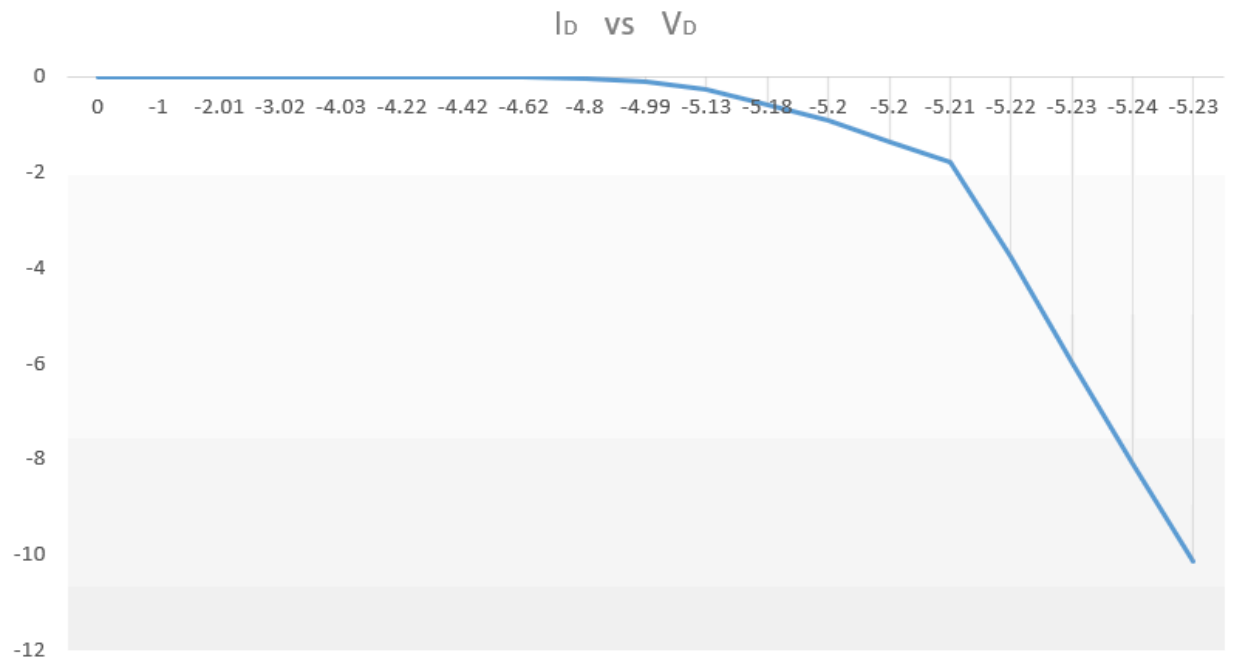
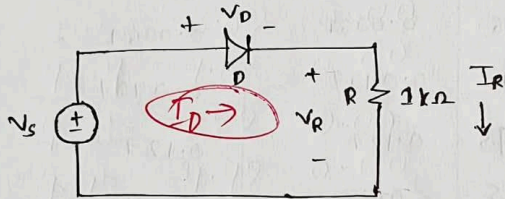
Figure 2:- Zener diode graph (I_D vs V_D)

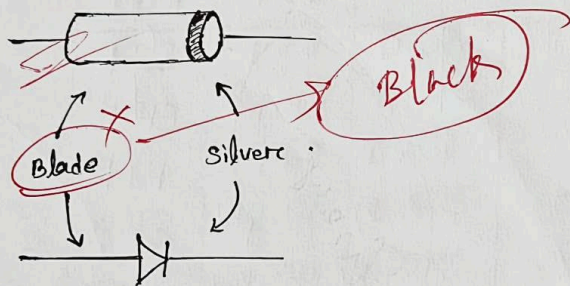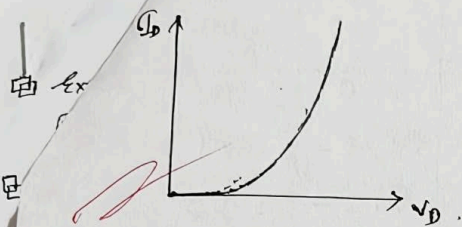# Appendix:

Semiconductors and zever Diode characteristics.

Semiconductors Diode characteristics:

$V_S \rightarrow$ 0V - 1V @ 0.1V

1V - 10V @ 1V

R (kΩ)	Vs (V)	VD (V)	VR (V)	$I_R = \frac{V_R}{R}$ (mA)	$I_D = I_R$ (mA)
0.983	0	0	0	0	0
	0.103	0.103	0	0	0
	0.228	0.226	0	0	0
	0.33	0.323	0.006	0.0061	0.0062
	0.427	0.386	0.04	0.0407	0.0407
	0.549	0.423	0.1245	0.127	0.127
	0.667	0.442	0.225	0.23	0.23
	0.726	0.449	0.275	0.28	0.28
	0.850	0.462	0.388	0.395	0.395
	0.919	0.467	0.450	0.458	0.458
	1.034	0.476	0.556	0.566	0.566
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	4.99	0.573	4.42	4.50	4.50
	6.01	0.585	5.42	5.513	5.513
	7.07	0.595	6.44	6.551	6.551
	8.04	0.603	7.44	7.57	7.57
	9.04	0.611	8.43	8.576	8.576
	10.0	0.618	9.40	9.563	9.563

I_D

V_D.

Blade   Silvere .   Black

Zener Diode charcacteristics :

$V_S \rightarrow$ 0V - 4V @ 2V
4V - 6V @ 0.2V
6V - 10V @ 1V

Experimen[t] R kN
Rectifie[r]
Half 0.468

+

CH₂

Vi (V)

10

-10

(V)

V_S (V)	V_D (V)	V_R (V)	$I_R = \dfrac{V_R}{R}$ (mA)	$I_D = -I_R$ (mA)
0	0	0	0	0
1.00	-1.00	0.00	0	0
2.01	-2.01	0.00	0	0
3.03	-3.02	0.00	0	0
4.04	-4.03	0.00	0	0
4.23	-4.22	0.00	0	0
4.43	-4.42	0.00	0	0
4.64	-4.62	0.00	0	0
4.83	-4.80	0.015	0.032	-0.032
5.04	-4.99	0.041	0.088	-0.088
5.26	-5.13	0.121	0.259	-0.259
5.47	-5.18	0.280	0.598	-0.598
5.63	-5.20	0.9263	0.903	-0.903
5.85	-5.20	0.636	1.35	-1.36
6.06	-5.21	0.844	1.803	-1.803
7.00	-5.22	1.769	3.78	-3.78
8.05	-5.22	2.81	6.004	-6.004
9.05	-5.24	3.80	8.12	-8.12
10.01	-5.23	4.75	10.149	-10.149

Orange

Black

2025 - October - 23

$\frac{10}{40}$