16.311 Electronics Lab. I

Experiment 2

Junction – Diode Characteristics

Objective:

1. Become familiar with the basic properties of junction diodes.
2. Measure and plot the forward and reverse-biases I.V. characteristics of a diode

Materials Needed:

1. One Signal Diode 1N914
2. One Rectifier Diode **1N4004**.
3. One Zenner Diode 1N751 (5.1volts)
4. Resistors; **330 Ohm, 1 meg.Ohm.**

Note:DMM - Digital Multimeter.

Procedure:

1. Diode measurement with **a DMM** ,1N914 (signal diode)
   a. Initially your DMM should be set to it's highest range.
   b. Measure it's forward resistance R_f as shown in fig. 1a
   c. Measure the reverse resistance R_r as shown in fig. 1b
   d. Place the DMM on the Diode range, repeat steps b & c
   e. Record the data in your notebook.
2. Diode measurement with **a DMM** ,**1N4004** rectifier diode)
   a. Initially your DMM should be set to it's highest range.
   b. Measure it's forward resistance R_f as shown in fig. 1a
   c. Measure the reverse resistance R_r as shown in fig. 1b
   d. Place the DMM on the Diode range, repeat steps b & c
   e. Record the data in your notebook.
3. . Diode measurement with **a DMM** ,1N751 (zenner diode)
   a. Initially your DMM should be set to it's highest range.
   b. Measure it's forward resistance R_f as shown in fig. 1a
   c. Measure the reverse resistance R_r as shown in fig. 1b
   d. Place the DMM on the Diode range, repeat steps b & c
   e. Record the data in your notebook.

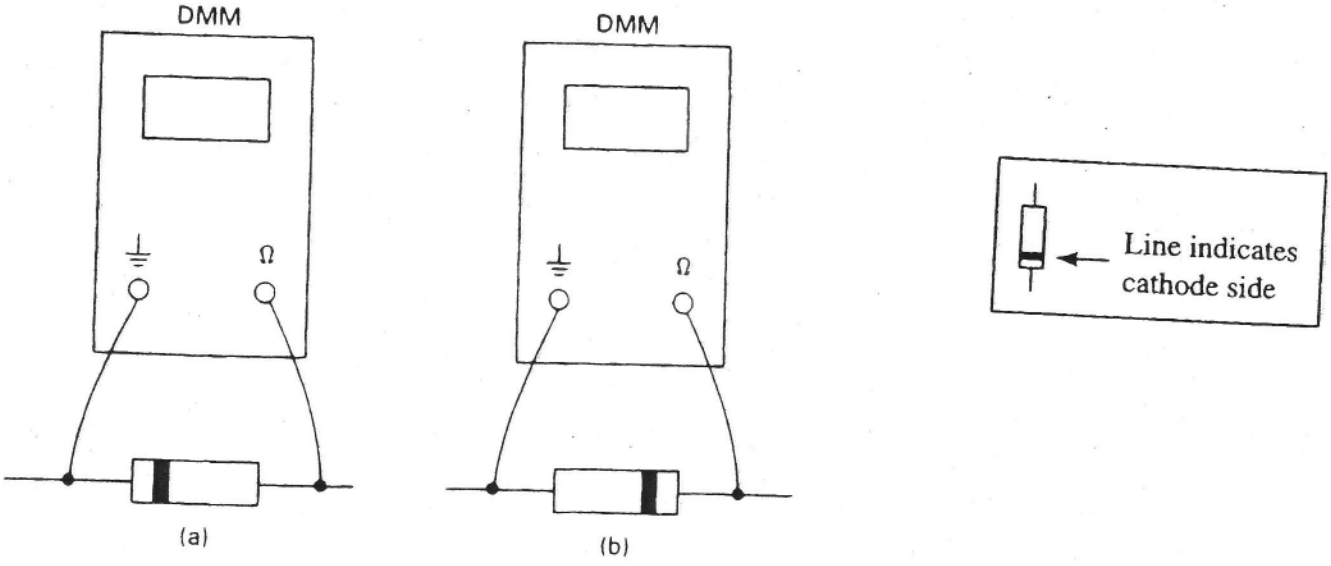


Figure 1

4. **Diode Conduction** – The Forward Drop, 1N914
   a.. Construct the forward-bias circuit shown in fig. 2, set P.S. to zero volts
   b. Monitor the forward voltage drop Vf across the diode, slowly increase $V_{S(P.S.)}$ to establish 0.45 Volts across the diode.
   c. Measure the voltage across the resistor R1 and record it in data table
   d. The diode forward current If can be found by applying Ohm's Law Compute and enter in the table.
   e. Repeat steps c and d for each voltage listed in table.

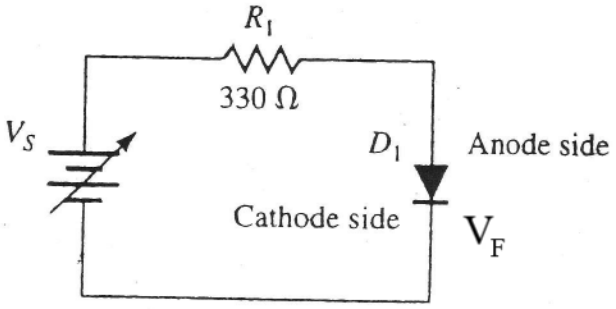


Figure 2

V_F (measured)	V_{R1} (measured)	I_F (computed)
0.45 V		
0.50 V		
0.55 V		
0.60 V		
0.65 V		
0.70 V		
0.75 V		

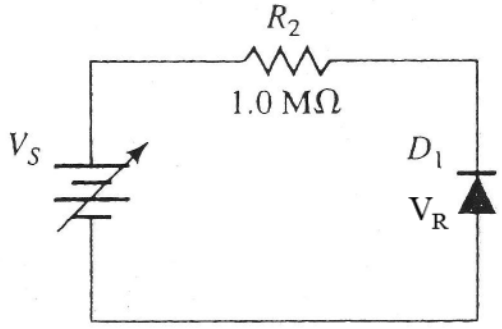
Data Table

5. **Diode Conduction** – The Forward Drop, **1N4004**.
   a. Construct the forward-bias circuit shown in fig. 2, set P.S. to zero volts
   b. Monitor the forward voltage drop Vf across the diode, slowly increase $V_{S(P.S.)}$ to establish 0.45 Volts across the diode.
   c. Measure the voltage across the resistor R1 and record it in data table
   d. The diode forward current If can be found by applying Ohm's Law Compute and enter in the table.
   e. Repeat steps c and d for each voltage listed in table.

6. **Diode Conduction** – The Forward Drop, 1N751
   a.. Construct the forward-bias circuit shown in fig. 2, set P.S. to zero volts
   b. Monitor the forward voltage drop Vf across the diode, slowly increase $V_{S(P.S.)}$ to establish 0.45 Volts across the diode.
   c. Measure the voltage across the resistor R1 and record it in data table
   d. The diode forward current If can be found by applying Ohm's Law Compute and enter in the table.
   e. Repeat steps c and d for each voltage listed in table.

7. **Reverse-Bias Current and Break-down Voltage**

a. Connect a reverse-bias circuit as shown below
b. Set the power supply to voltages as in the table below.
c. Measure and record the voltage across R2 , compute the reverse current.
d. Note that the Fluke meter has input resistance of 10 meg. Ohms
(adjust your calculations to allow for meter loading)
e. Repeat for each diode and record the results.



Vs	V_R (measured)	V_{R2} (measured)	I_R (computed)
5V			
10V			
15V			
20V			