

Diode Properties and the Circuits

Name _____ ID _____

Partners _____

Date _____ Section _____

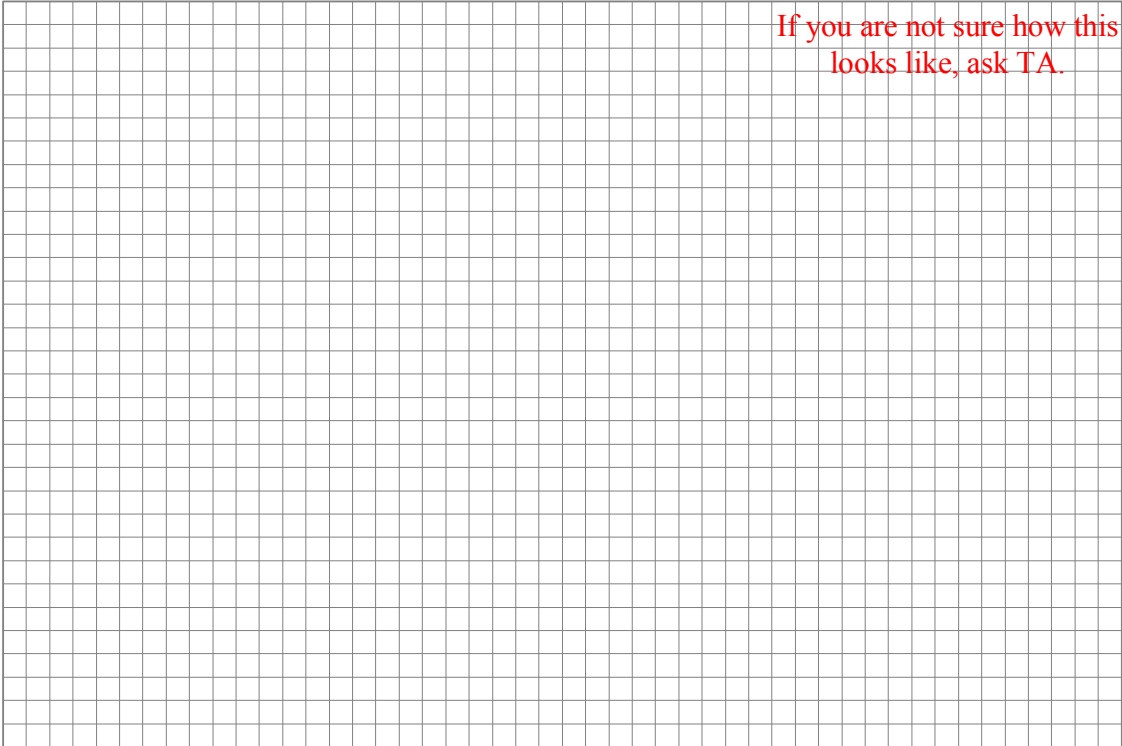
Please be careful about touching the diode because the current heats up the part.

1. A diode’s property in DC voltage:

Use the variable voltage source. (*Measure the voltage in the diode.*)

Forward bias		Reverse bias	
Voltage (V)	Current (mA)	Voltage (V)	Current (mA)
V _c = 1 V		V _c = 1 V	
V _c = 2 V		V _c = 3 V	
V _c = 3 V		V _c = 5 V	
V _c = 4 V		For reversed bias, the expression of voltage values is negative.	
V _c = 5 V			

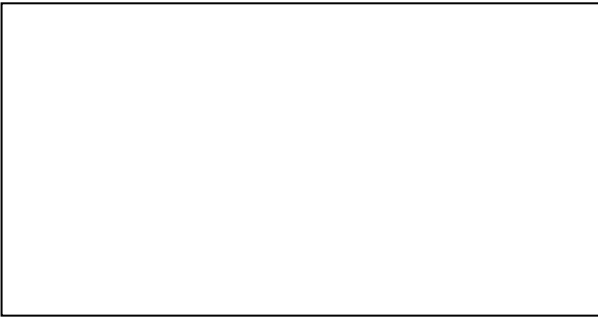
- Plot the above results on a graph sheet, and make sure if it is appropriate.



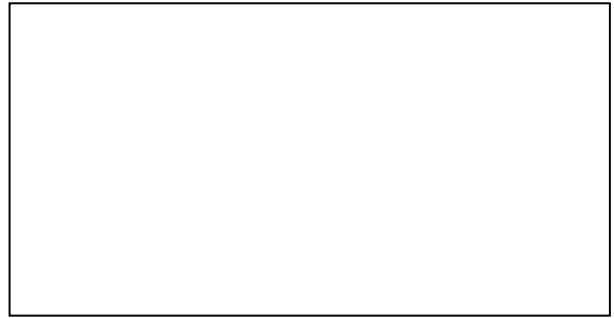
2. A diode's property in AC voltage (Half-wave rectification):

For this part, draw the voltage curves displayed on the oscilloscope under the following conditions.

- Voltage for the resistor without the diode

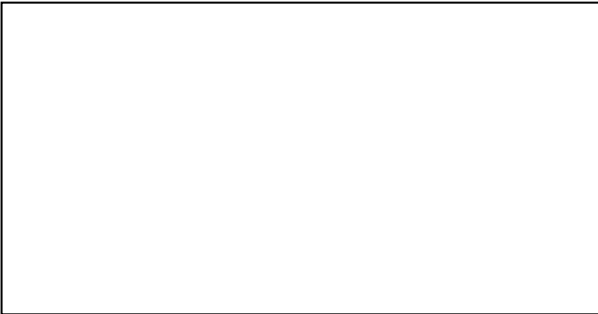


- Voltage for the resistor with the diode



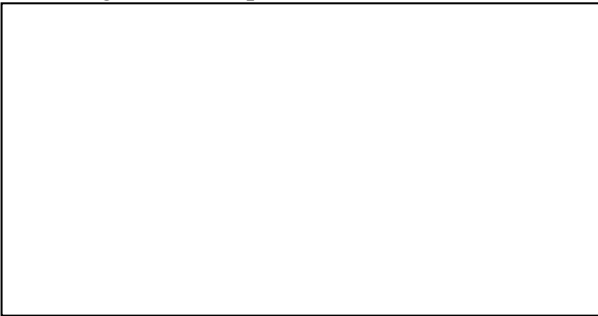
After flipping the direction of the diode,

- Voltage for the resistor



3. RC circuit with diode

- Voltage for the capacitor



4. A human antenna

The period of the envelope waves _____ (s)

The frequency of the envelope waves _____ (Hz) ⇔ *close to 60 Hz*

Lab Procedure for Diode Properties and the Circuits

The current will heat the diode. Please do not touch the diode. You should pick up the wires around the diode with your fingers.

1. A diode property in DC voltage

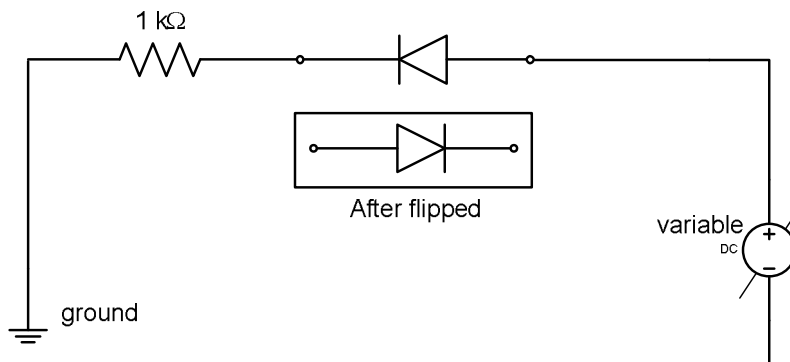
- Pick up the diode and make sure the direction. ⇒
- Make sure the provided circuit is appropriately arranged on the breadboard; you will measure the 5 currents with respect to the different voltages.

The reason why you have to use this kind of complicated circuit is for convenience in measuring the appropriate voltages and currents. Remember that resistors adjust the currents and voltages in a circuit.

Voltage is measured with a parallel circuit, and current is measured in a series circuit connection with multimeter.

You have to measure the voltages in the diode, NOT the resistor.

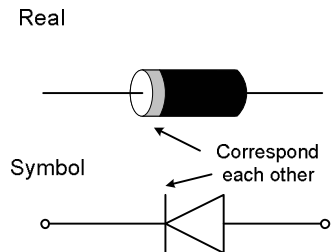
- Change the 5 voltages with the following data sheet.
- After the above measurement, flip the direction of the diode; then, measure the reversed currents for three different voltages. (Be careful! The diode might be very hot.)
Just follow the data sheet, and make sure if there will be a little current.

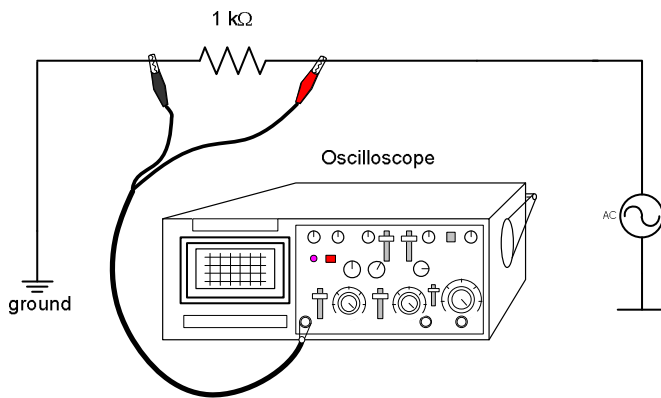


- Plot the data on a graph sheet.
The instructor will show the appropriate shape of the graph, so compare your graph with the one s/he shows.

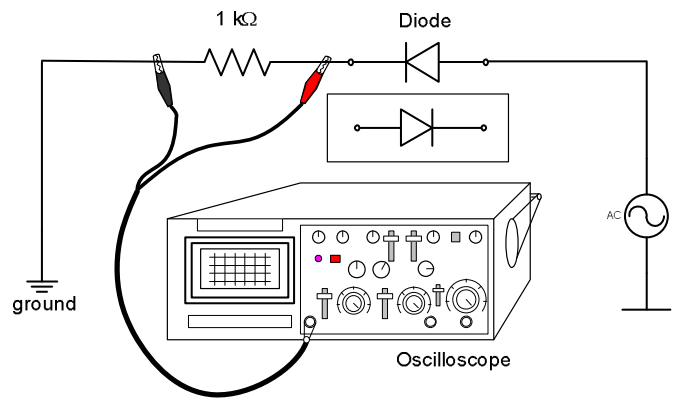
2. A diode's property in AC voltage

- Change only the voltage sources from DC to AC.
If you are not sure, please ask the instructor.
- Connect the wires from the oscilloscope to the resistor, and display the voltage curves.
 1. Voltage of R without diode; 2. Voltage of R with diode; 3. Voltage of R with flipped diode.





Case 1

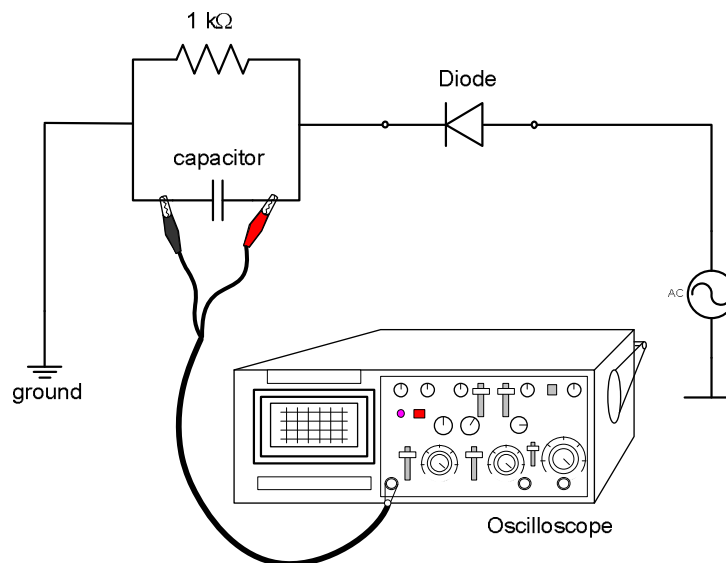


Cases 2 & 3

- **Follow the data sheet, and you will draw 3 different curves.**
This is for a qualitative comparison. You will see the direction of voltage and current is only one side because of diode.

3. RC circuit with diode

- **Make the circuit and measure the voltage on the capacitor with the oscilloscope.**
Just sketch the voltage curve displayed on the oscilloscope.



4. A human antenna

- **Grab the oscilloscopes (+) and (ground) terminals with your hands.**
- **Adjust the scale of the frequency on the oscilloscope so that you can have the envelope waves.**
- **Read the period for the “envelope wave.”**
Then you can calculate the frequency.