

Lab report #3

Electrotech CS1025

Jakub Slowinski

Student number: 16319781

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Lab Session #2- 4.00-6.00pm

Introduction:

A diode is an electronic device which has a conductor at each ends. The principle behind the diode is similar to a valve or a gate, which only lets electricity flow in one direction(called the diode's forward direction).

An oscilloscope is a measurement instrument that displays a picture of the way that a voltage changes over a period of time.

A capacitor is a two-terminal element that stores energy in an electric field.

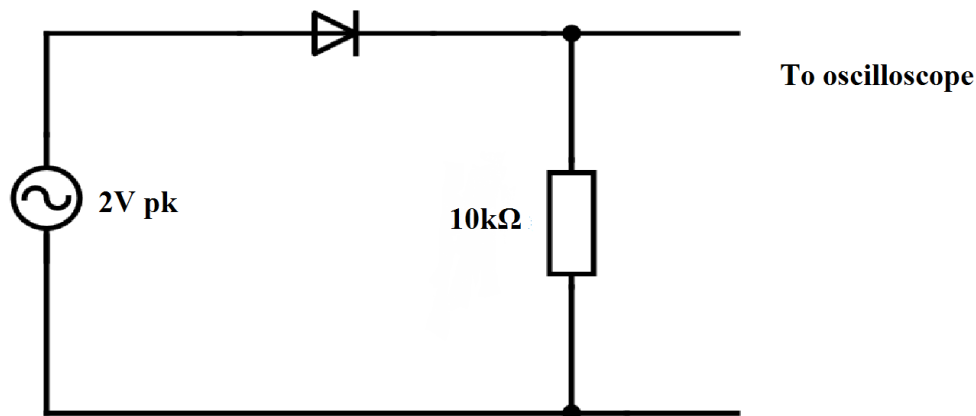
Capacitance is the ability to store electrical energy. A higher capacitance in a capacitor will allow it to store more charge.

We output the circuit to the oscilloscope to visually view the way the voltage flows.

My aims in this experiment was to analyse the waveforms on oscilloscopes and interpret the results in relation to the capacitors used.

Method:**Part 1:**

FIG.1



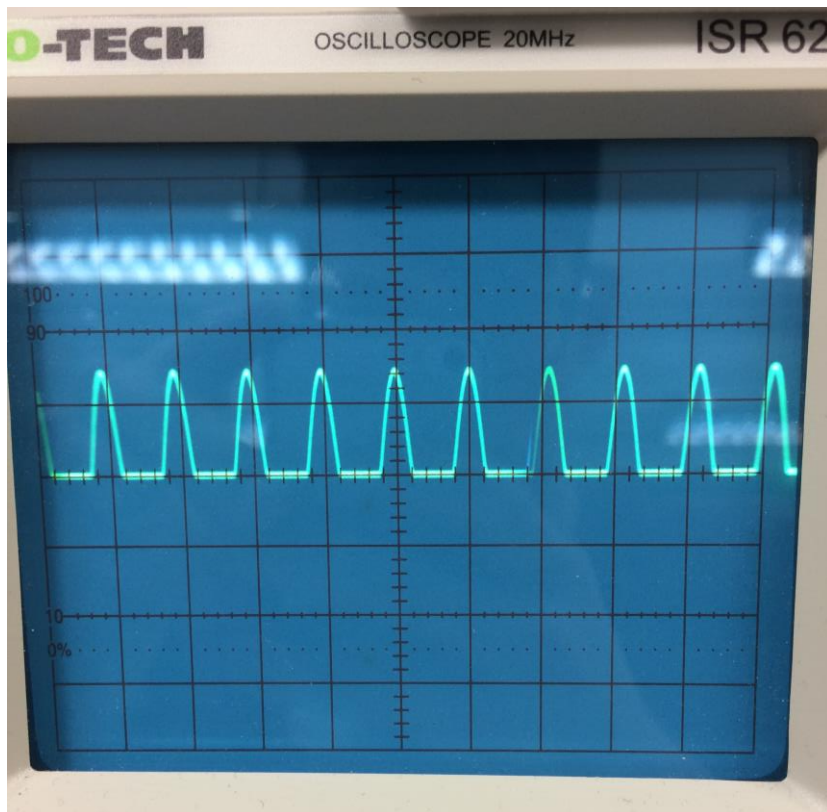
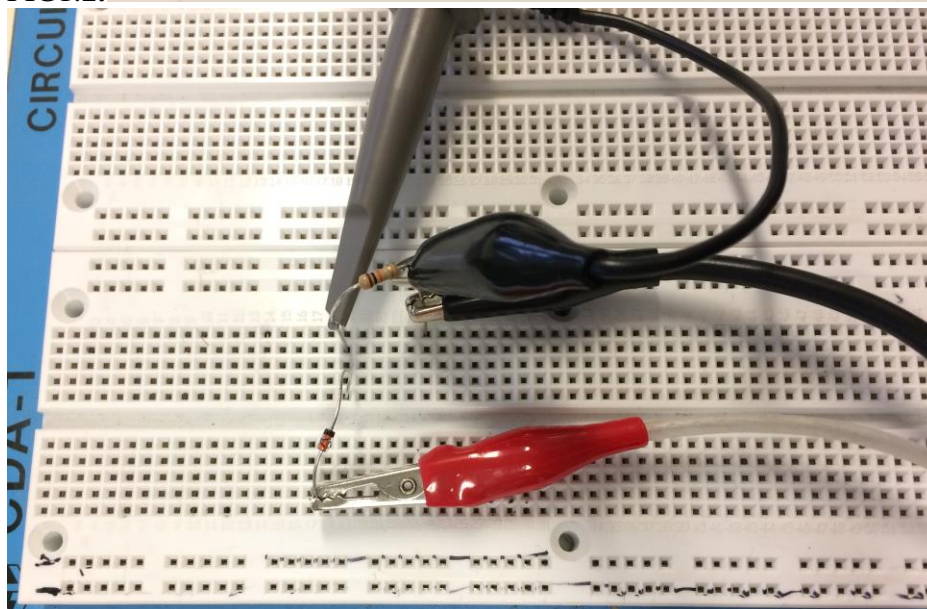


FIG1.2.



My circuit was set up as shown above if FIG.1.1. I first tested the resistance of the 10k ohm resistor. I used a multimeter set to ohms in this instance. I set up my circuit as illustrated above in FIG.1.3. I set the A.C. power supply to 2 peak volts. I used a 10K ohm resistor and had one diodes at the beginning of the circuit to recify the current. This was then output to an oscilloscope. I placed the nodes of the oscilloscope on each side of the most right diode. I received a cut in voltage of 1.7V. The oscilloscope graph in FIG1.2. shows the graph of the varying voltage in forward bias.

Part 2:

FIG.2.1.

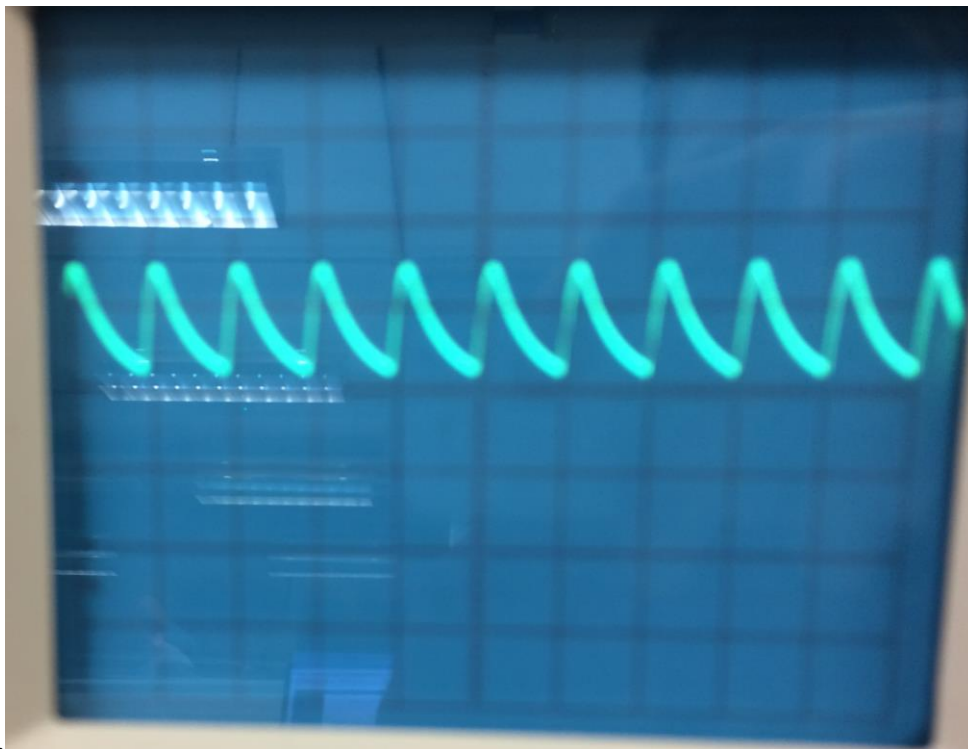
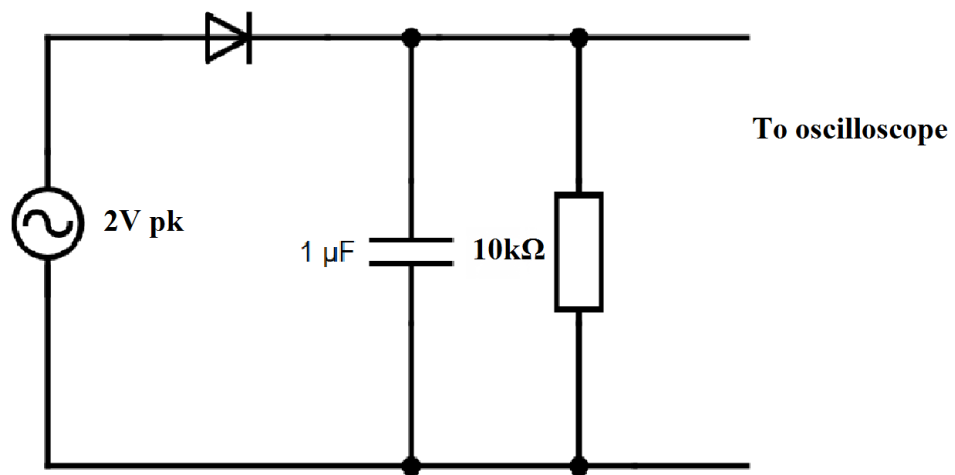


FIG2.2.

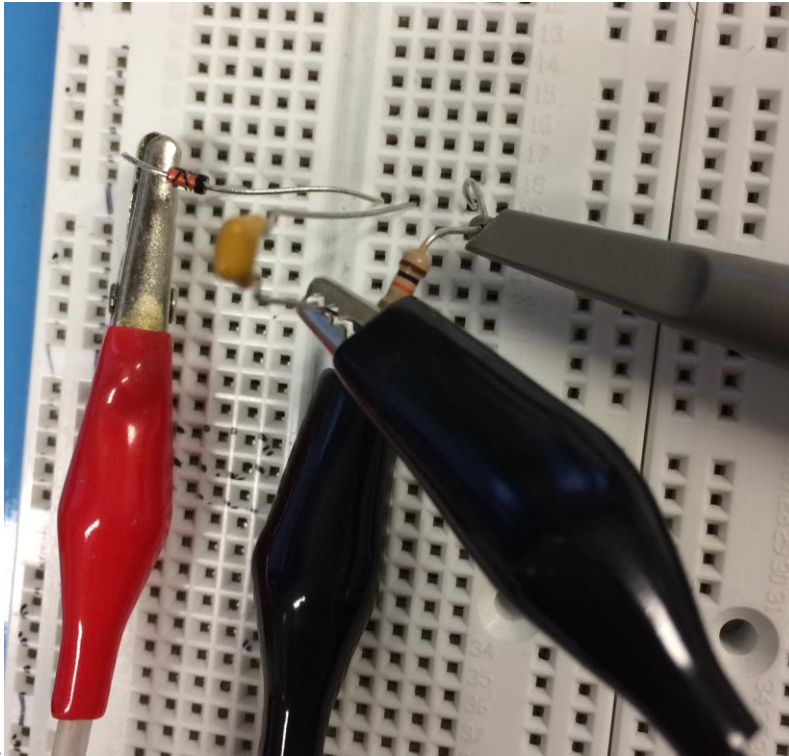


FIG.2.3.

My circuit was set up as shown above if FIG.1.1. The second part of the laboratory experiment contained an extra capacitor in the circuit as illustrated in FIG.2.1.

. I kept the A.C. power supply at 2 peak volts. I used a 2.2K ohm resistor and had 2 diodes facing opposite ways in parallel. This was then output to an oscilloscope. I placed the nodes of the oscilloscope on each side of the most right diode. I received a cut in voltage of 1.7V. The oscilloscope shows the capacitor discharging most of its charge rapidly. It then takes a short time to recharge The diode rectifies the voltage.

The frequency was increased to 2 kHz bringing with it a smaller wavelength.

Part 3:

FIG.3.1.

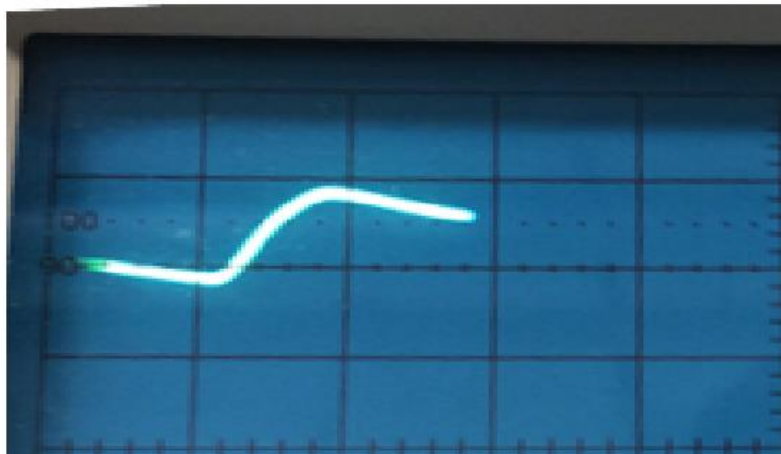
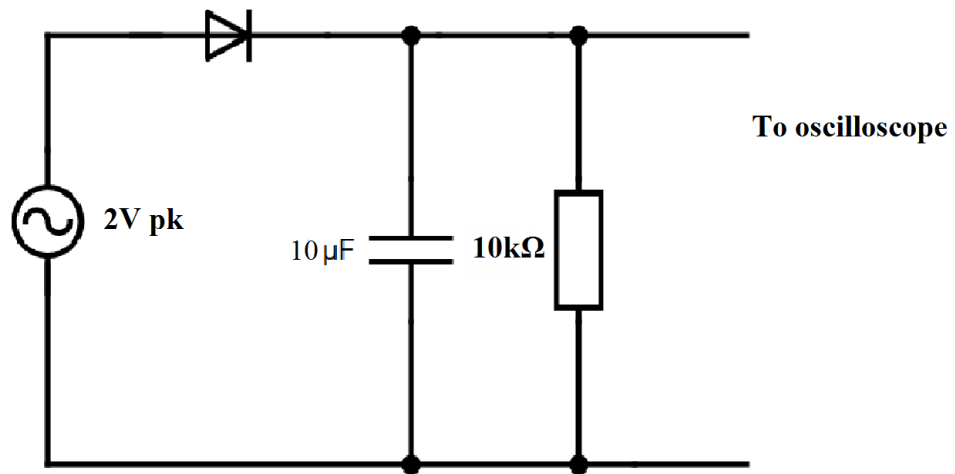


FIG3.2.



FIG3.3.

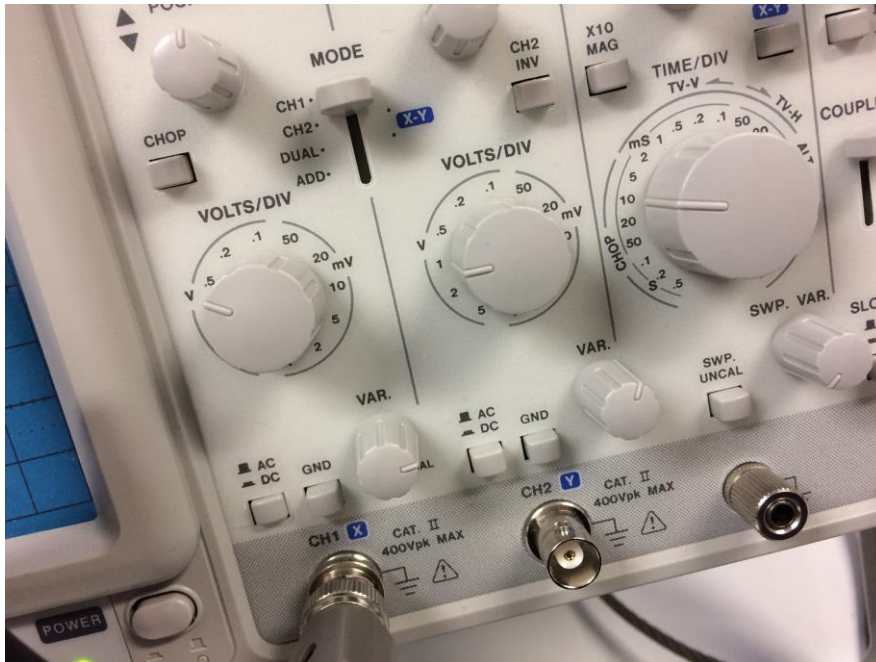


FIG.3.4

The circuit in part 3 was the exact same as part 2 except the capacitor was replaced for one with greater capacitance.

The capacitor discharged so fast that it was near impossible to take a still image from the oscilloscope. FIG.3.2. was the best and clearest image I could take and it shows the upper left quarter of the oscilloscope graph.

I observed a rapid discharge followed by a short recharge period.

I included the oscilloscope settings in FIG.3.4. in order to highlight the speed of discharge.

Conclusion: In all three instances the diodes does full wave rectification. There is no negative voltage as shown in the graph on the oscilloscopes in FIG1 and 2. The experiment proved that higher the capacitance the more electrical energy a capacitor can store. There are many uses of an ac to dc convector such as in computers, televisions, cell phone chargers, and other electronic devices. They are also used in medical, military, and telecommunications equipment; kitchen appliances; industrial machinery; and any products that use DC motors.