Electrotechnology
Lab report #2

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Introduction:

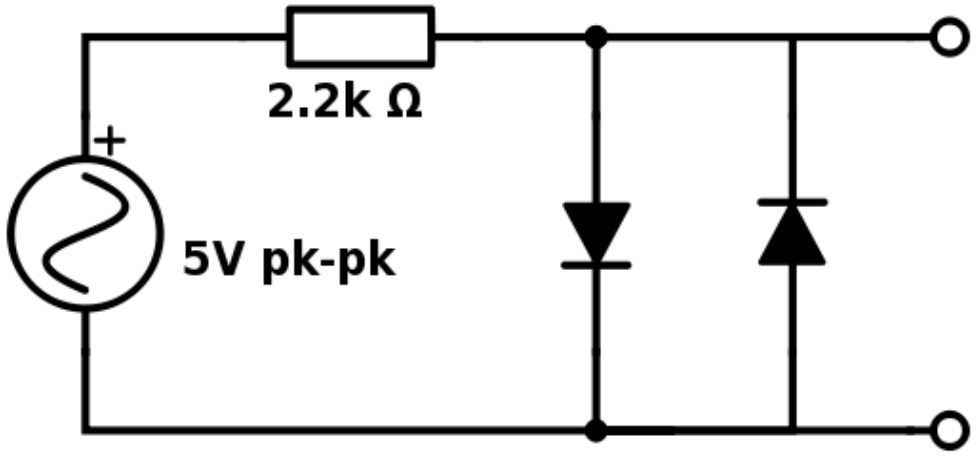
AC Power behaves quite differently from DC power as it is constantly changing, and instead of moving in one direction (Positive to negative) it changes direction depending on its frequency.

Part one: Finding the cut in voltage for the diode

Method:

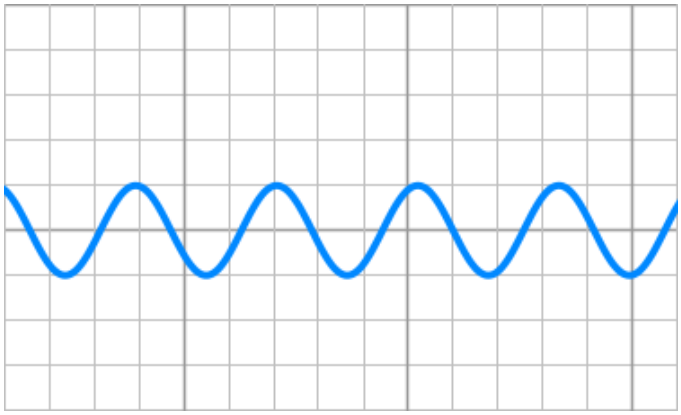
1. The circuit was set up as shown in the diagram, hooking up the wires to the scope so that the voltage could be seen using an oscilloscope
2. The voltage was first set to 5V to observe the sinusoidal type waved created by the circuit
3. To estimate the cut in voltage for the diode, the voltage had to be changed to a point where it could be seen and estimated with more accuracy. The cut in voltage would be expected to be at a much lower voltage than what is to be normally supplied
4. After setting the voltage to a point where the diode didn't cut in, the input was noted (0.5 Volts)
5. The voltage was then set to a point where the diode did cut in, then it could be estimated that the cut in voltage was somewhere between these two points (1 Volt)

Circuit Diagram:

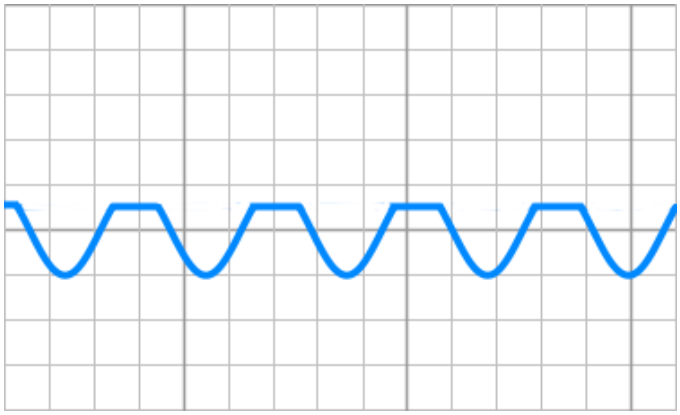


Results:

The maximum voltage without the diode cutting in was found to be 0.5V at the peaks. This was a full sinusoidal wave with no breaks in it. The two diodes however change this at higher voltages, allowing electricity to pass through them under certain conditions.



However when the voltage was set to 1V the diode did cut in, this can be seen at the points where the sinusoidal seems to flatten out.



Due to this, I estimated the cut in voltage to be around 0.75V, with an ideal diode it would cut in immediately however 0.75V is sufficient for a 5V circuit.

Interpretation:

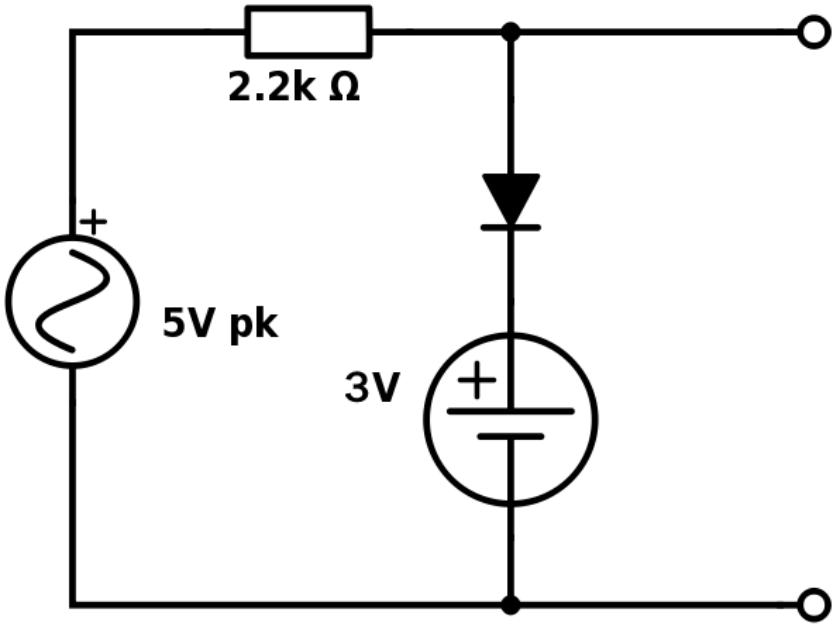
This circuit clearly shows the way an AC power supply works in its way of constantly changing the direction of flow. The circuit also demonstrates how a diode only allows current to flow through one direction after a certain cut in voltage, and what effects that has on an AC circuit.

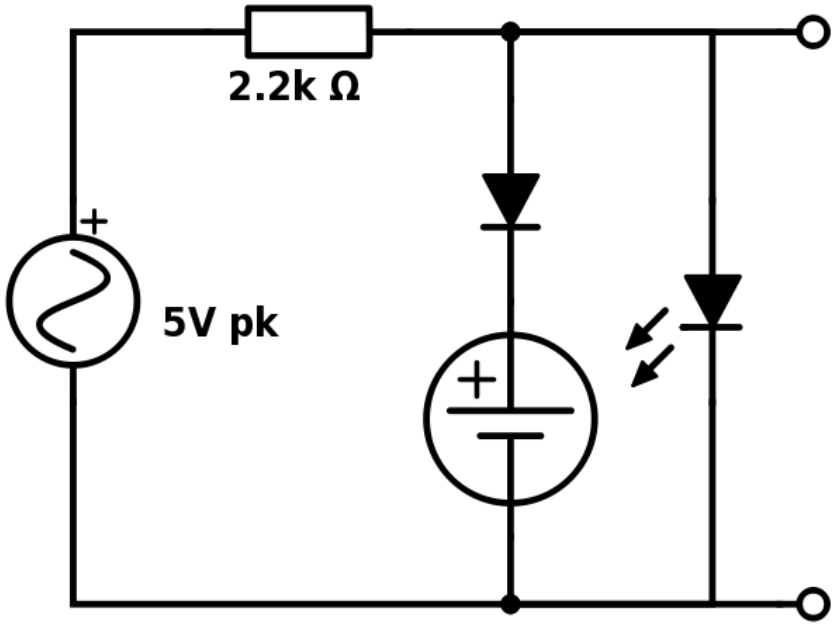
Part two: Sinusoidal waves from AC power

Method:

1. The first circuit was set up as shown in the circuit diagram, initially without the LED
2. The wave was then measured with an oscilloscope
3. This was repeated for the other circuit, which included the LED

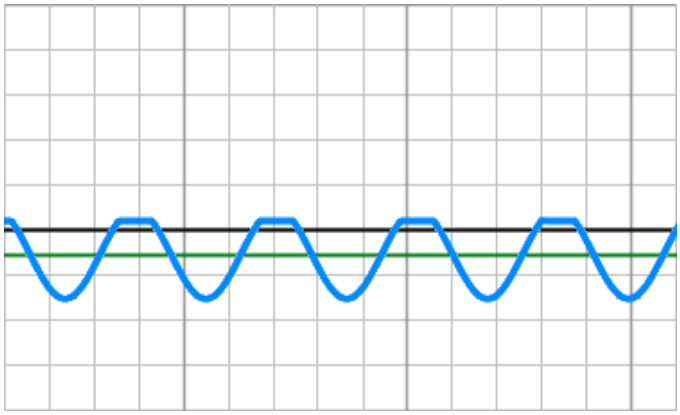
Circuit Diagrams:



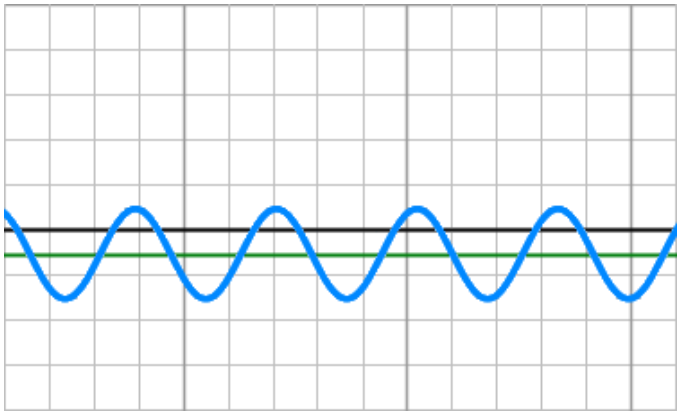


Results:

The wave formed without the LED looked like:



And the wave formed with the LED looked like:



The black line represents where the sine wave would have been had the 3V DC power supply not been there and the green line represents where it was moved down to due to the DC power supply.

Interpretation:

The wave without the LED had the very top of it be cut off, this is where the diode cut in, however, due to the way the voltage was changed by the DC power supply, it only cut off the very top of it, a lot less than it usually would.

With the LED no cut off is observed this is due to the current being divided through the two diodes, allowing all of it to pass through and make a full wave.