**CMPE314: Principles of Electronic Circuits**

**Dr. Yan**

**Lab 03 Report:**

**Clippers and Clampers**

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1. **Objective**

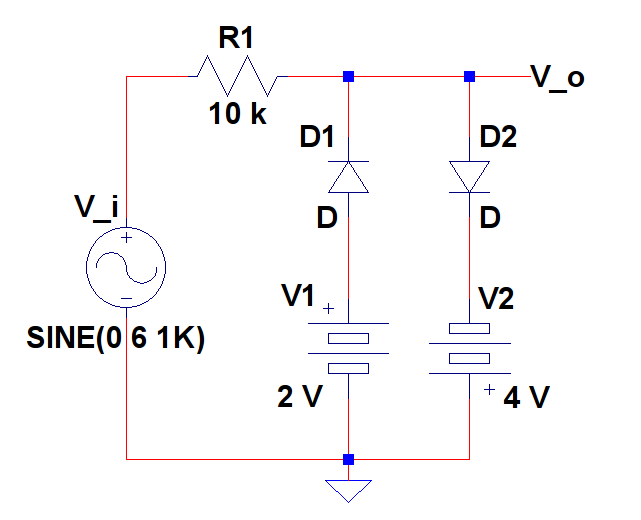
Construct and measure clipper and clamper circuits and study their characteristics.

1. **Equipment**
   1. Resistors; 2 × 10 kΩ, 1 × 100 kΩ
   2. Capacitors; 1 × 0.22 µF
   3. Diodes; 2 × 1N4738, 1 × 1n4740
   4. Oscilloscope, DC power supply, digital multi-meter, function generator, breadboard
2. **Background**

Clipper circuits limit or constrain signals by clipping off part of the signal in some region or compressing it in that region using a resistive voltage divider. Clamper circuits set a minimum and maximum value on an output AC waveform by shifting the DC level of the steady-state AC signal instead of altering its shape.

1. **Procedures**

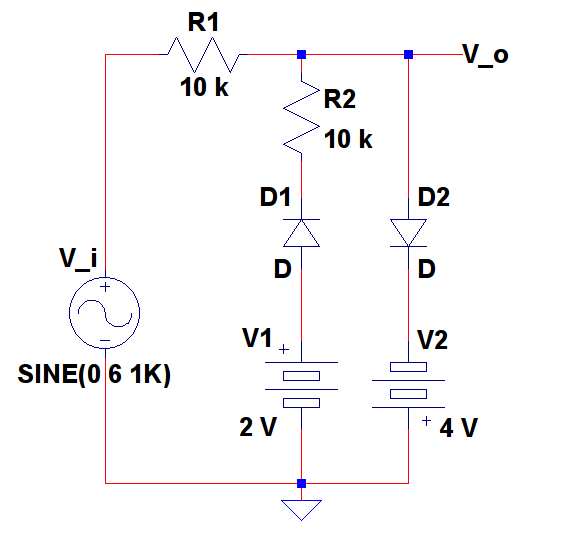
**4.1 Part A. Clipper Circuit I**

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**Figure 1: Clipper Circuit Without Resistor**

* 1. Use a 1N4738 diode to construct the circuit from Figure 1.
  2. Set the input signal amplitude to be 6 V and frequency to be 10 kHz.
  3. Capture the input and output voltages on the oscilloscope with the input being a sinusoidal, square and saw-tooth waveform, respectively.
  4. Save the sinusoidal input and output waveform data to plot alongside their theoretical computation.

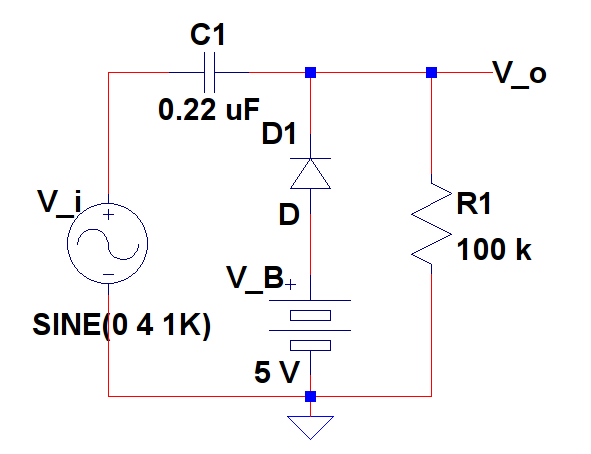
**4.2 Part B. Clipper Circuit II**

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**Figure 2: Clipper Circuit With Resistor**

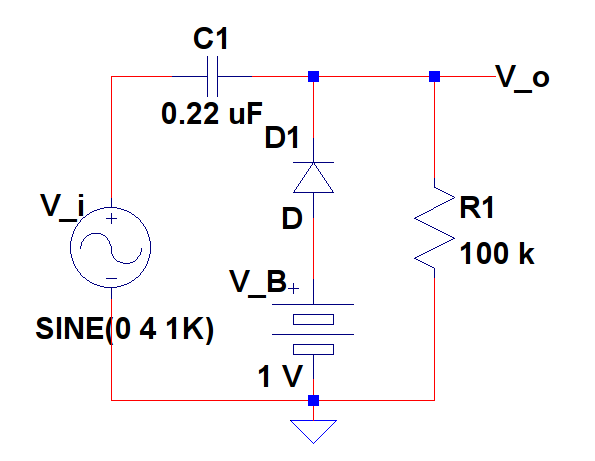
1. Repeat Part A with Figure 2.

**4.3 Part C. Clamper Circuit**

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**Figure 3: Clamper Circuit with = 5 V**

1. Use a 1N4740 diode to construct the circuit from Figure 3.
2. Set the input signal amplitude to be 4 V and frequency to be 10 kHz.
3. Capture the input and output voltages on the oscilloscope with the input being a sinusoidal and a square wave with +2 V peaks and -4 V valleys, respectively.
4. Save the sinusoidal input and output waveform data to plot alongside their theoretical computation.



**Figure 4: Clamper Circuit with = 1 V**

1. Repeat steps a. to d. with = 1 V as in Figure 4.
2. **Results**

Since there were no potentiometers available in the lab kit, several resistors of different resistance were used in an iterative/brute-forced manner. The value of RL computed in the pre-lab was around 4 kΩ. RL\_measured turned out to be 7.25 kΩ.

1. **Conclusion**

The value of the load resistance, RL,computed theoretically had a very high percentage error to the actual measured value. . The result is due to the fact my approach to computing the value on the pre-lab assignment was incorrect, otherwise the value computed theoretically should have been closer to the value measured.