# EET-200L Lab #3: Diode Clippers & Clampers Exercise

Construct each of the circuits indicated below. Read the instructions carefully for each step as some schematics might be modified slightly. You should analyze each circuit BEFORE connecting it to determine the expected output.

**Components:**

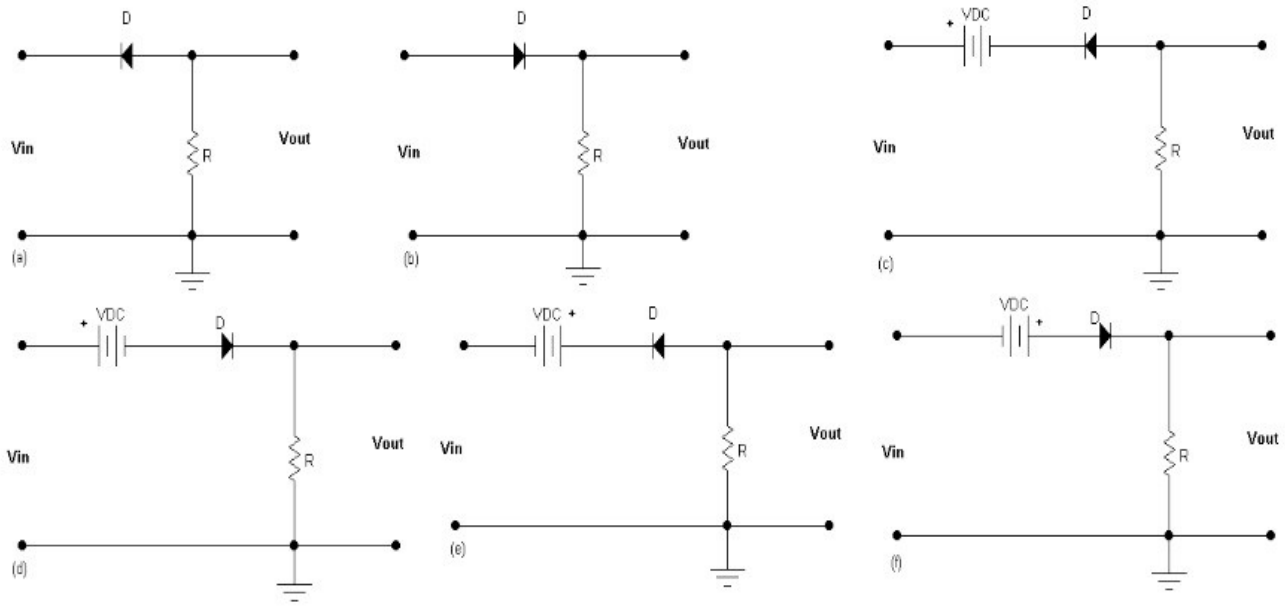
220Ω & 10kΩ resistors
10μF electrolytic capacitor
1N400x silicon diode
2-cell AA battery holder
2 AA batteries
PAD-234 Experimenter Protoboard
Agilent Digital Oscilloscope

You will use the Agilent oscilloscopes to capture screen shots from each circuit. It is advised that you capture a screen shot from each circuit you construct, but you should only post one screen shot from each set of circuits (for a total of 3 posted shots). **Your screen shot should include:**

a.) the input waveform
b.) the output waveform
c.) measurements showing the relevant signal voltages
d.) your initials (and that of your lab partner, if applicable)

You will then create a post in the form of a "Reply" to the *Week #4* topic in the EET-200 Lab section and post each of your screen shots. (All three screen shots should be posted in a single reply.)

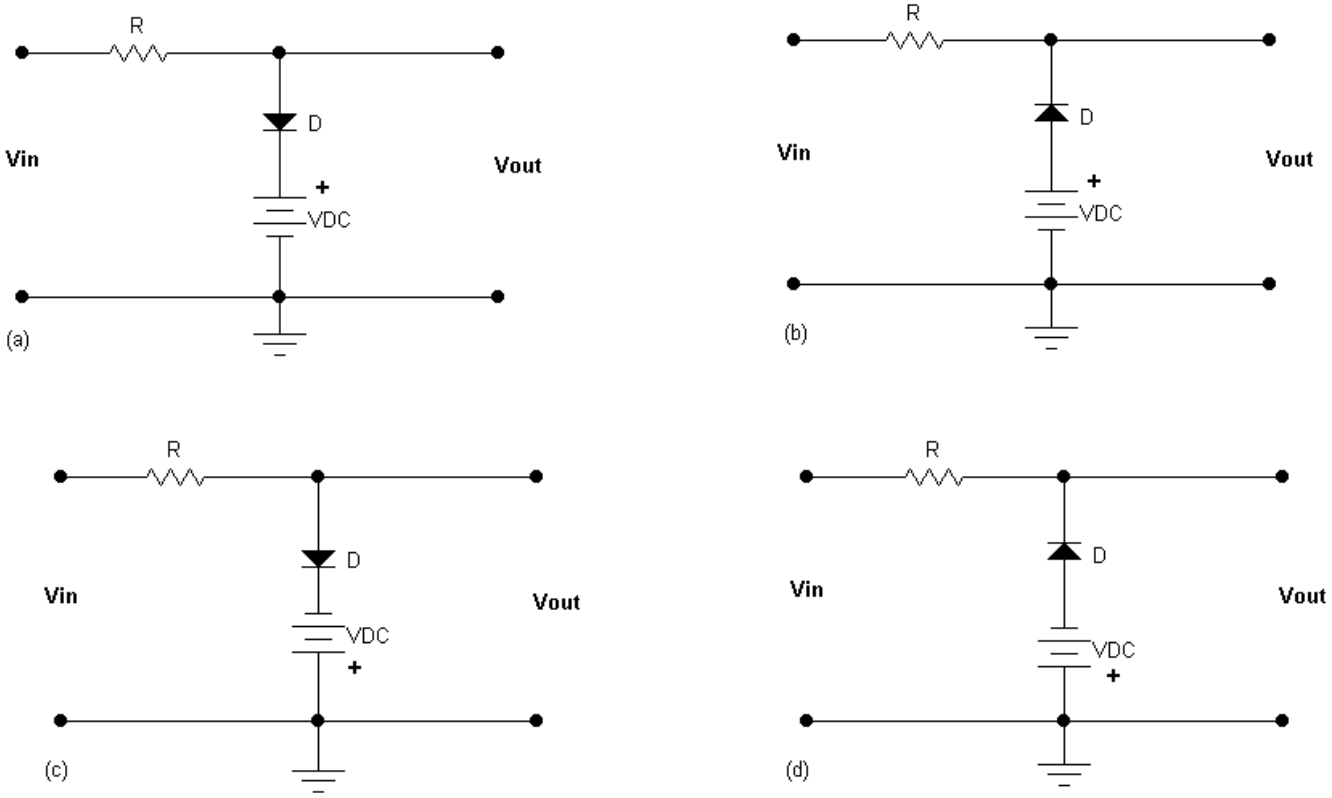
1.) Determine under which conditions each diode in the circuits below will be forward biased (FB) and reverse biased (RB). Construct each circuit, then verify that the display you see on the oscilloscope supports your reasoning for when the diode is FB/RB. You should post the screen screen from either circuit c, d, e or f. Be sure to state which circuit your screen shot is from in your post. For each circuit below make R=220Ω, Vin should be a ± 5V 200 HZ sine wave and VDC should be 2 AA cells (2.4-3VDC).



2.) a.)Determine under which conditions each diode in the circuits below will be forward and reverse biased. Construct each circuit, then verify that the display you see on the oscilloscope supports your reasoning for when the diode is FB/RB. You can post the screenshot from whichever circuit you want. Be sure to state which circuit your screen shot is from in your post. For each circuit below make R=220Ω, Vin should be a ± 5V 200 Hz sine wave and VDC should be 2 AA cells (2.4-3VDC).

Measure and record VDC = _____

b.) Repeat circuit a above but change Vin to a 200 Hz ± 5V Triangle wave.

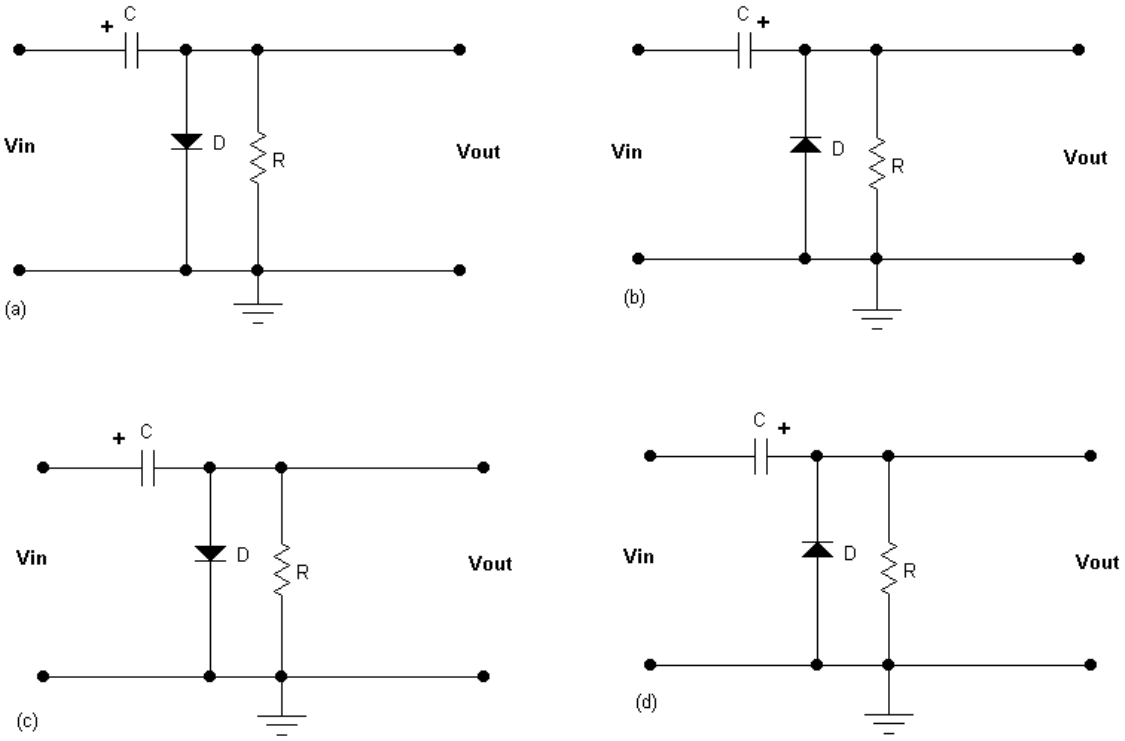



3.) Determine under which conditions each diode in the circuits below will be forward and reverse biased. Construct each circuit, then verify that the display you see on the oscilloscope supports your reasoning for when the diode is FB/RB. You can post the screenshot from whichever circuit you want. Be sure to state which circuit your screen shot is from in your post. For each circuit make R=10kΩ and C=10μF electrolytic cap. Be careful that your capacitor is installed with the **proper polarity** as indicated in the schematics. Reverse polarity of an electrolytic capacitor will cause it to malfunction, and possibly explode.

For circuits a & b, Vin should be a ± 5V 200 Hz sine wave and for circuits c & d Vin should be a ± 5V 200 Hz square wave. Put your DMM across the capacitor and measure & record its voltage (Vc) during each step.

Step a: Vc = _____ Step b: Vc = _____

Step c: Vc = _____ Step d: Vc = _____




4.) Explain why you measured the voltage you did across the capacitor. Where did this voltage come from? Why didn't the capacitor discharge this voltage?

5.) Have your instructor initial that you have completed this exercise.

Instructor's initials_____ Date_____

6.) Be sure to make your forum posts with the appropriate screenshots properly labelled.

7.) Put away all of your components in the proper locations and leave your work area neat.

8.) Use Electronics Workbench 5.1 (or Multi-Sim/Circuit Maker/etc.) to simulate each of the circuits you took screen shots of and compare the simulation results to your captured screen shots.