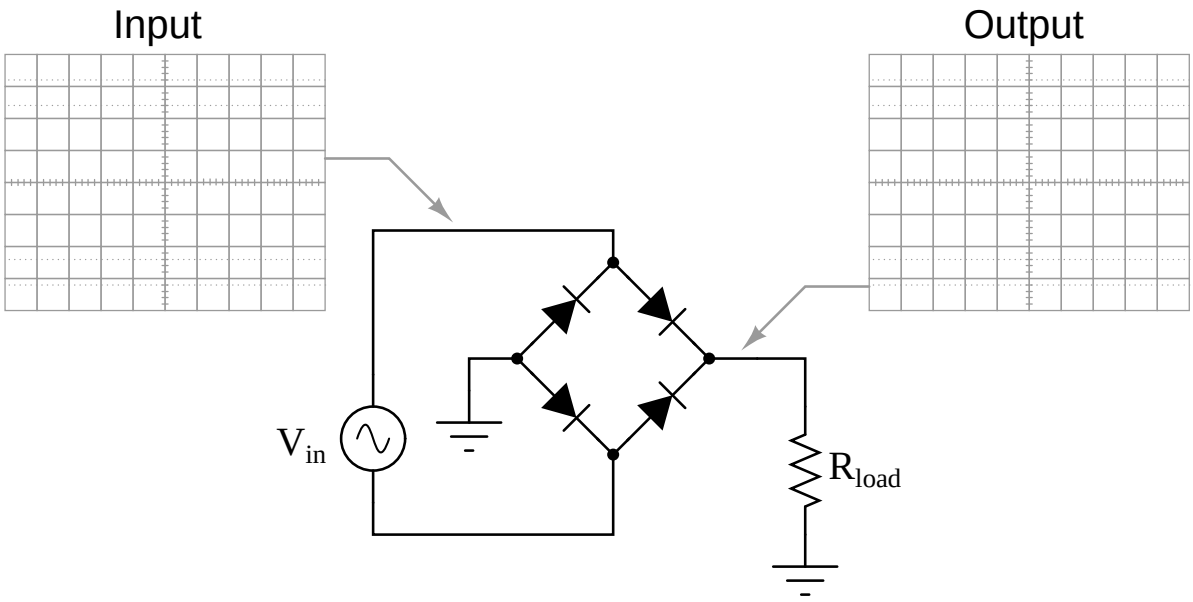
Question 1

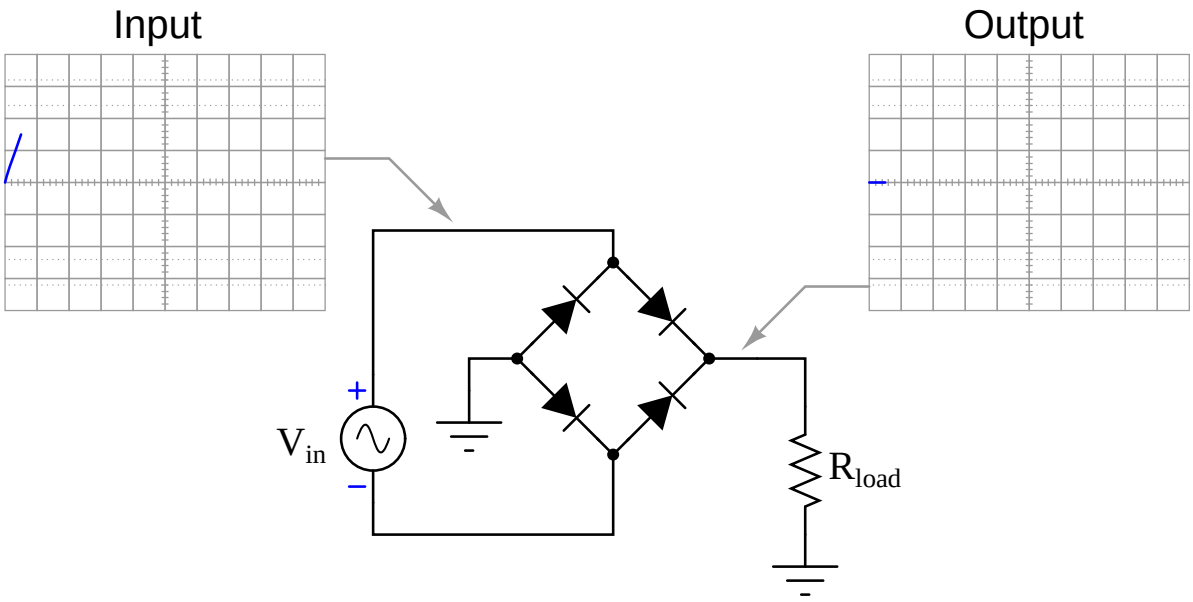
Animation: bridge rectifier circuit, with real diodes

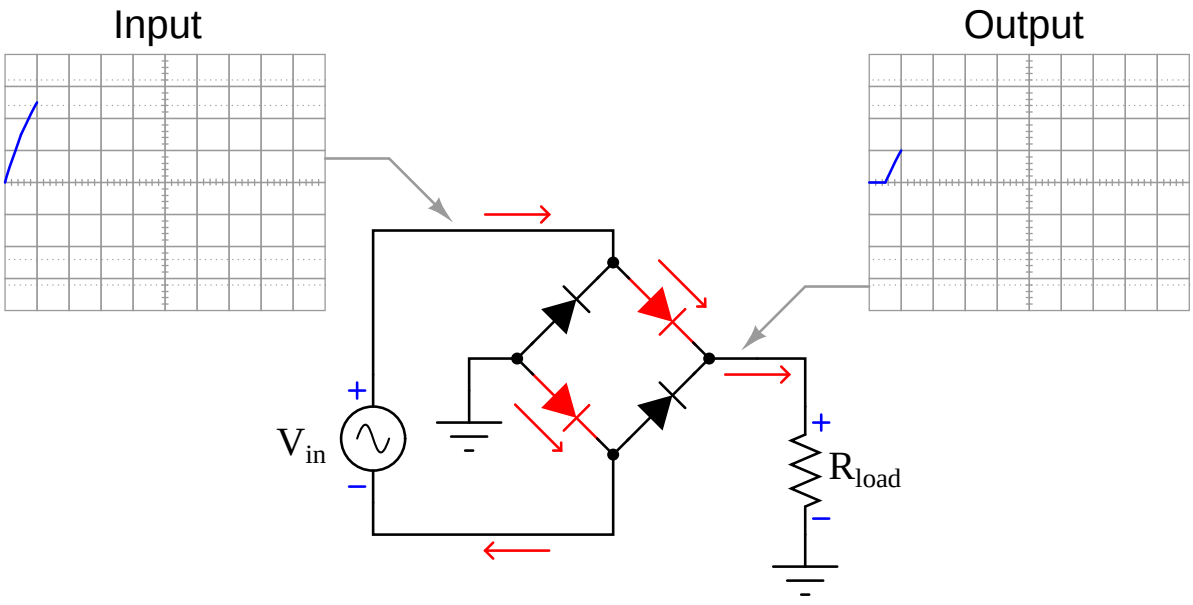
This question consists of a series of images (one per page) that form an animation. Flip the pages with your fingers to view this animation (or click on the "next" button on your viewer) frame-by-frame.

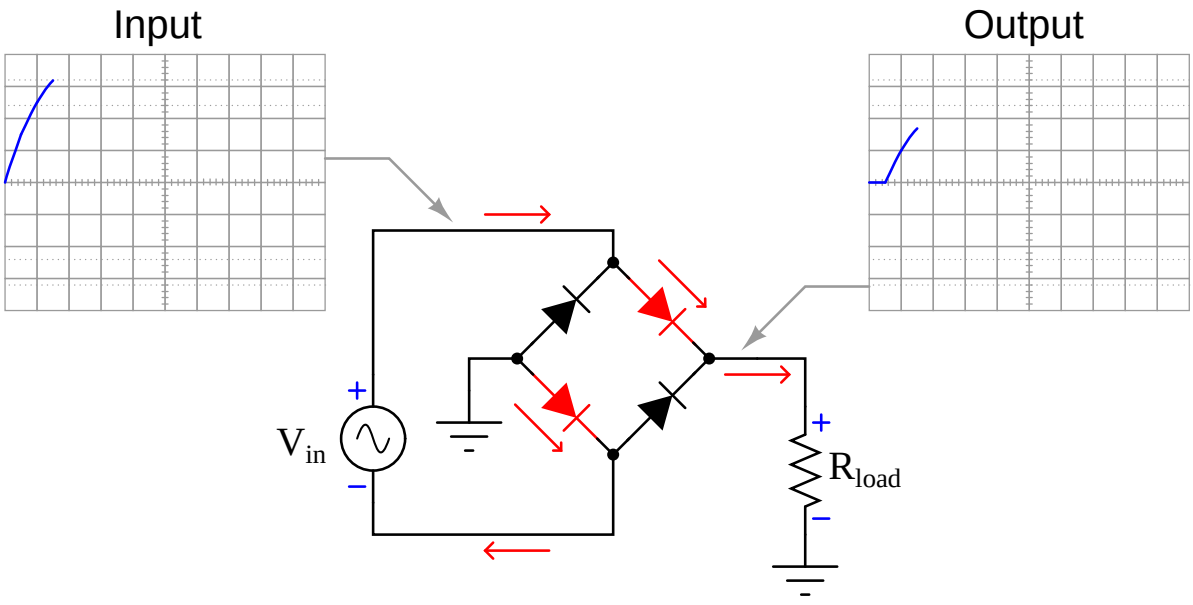
The following animation shows a bridge rectifier circuit in action. Here are some things to look for:

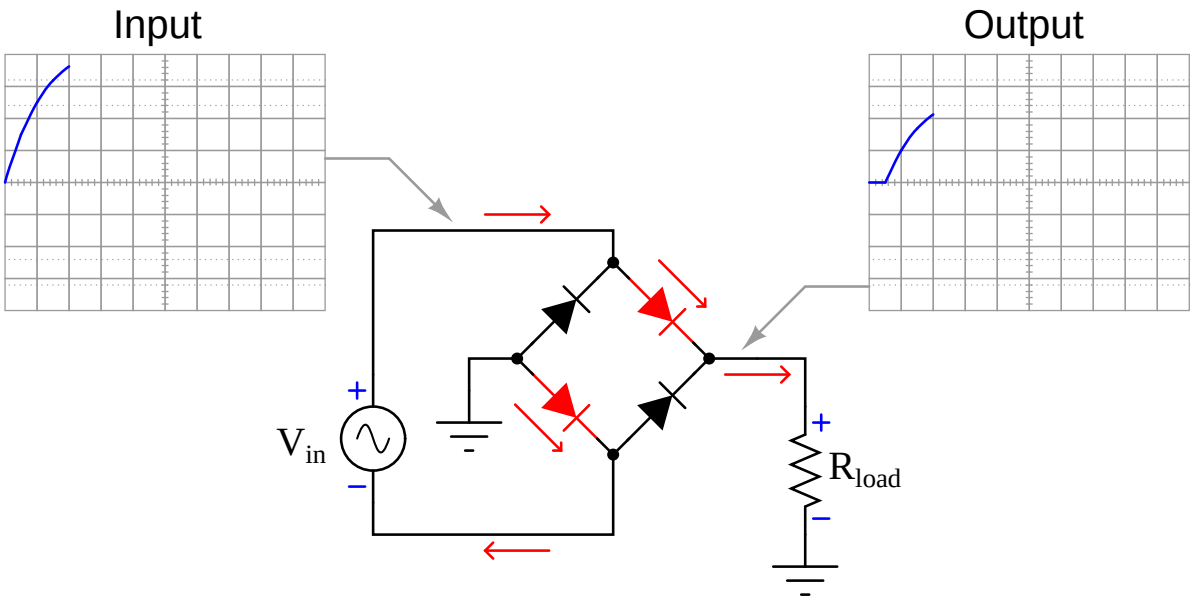
- How many diodes are in conduction at any given time?
- Is the output half-wave or full-wave?

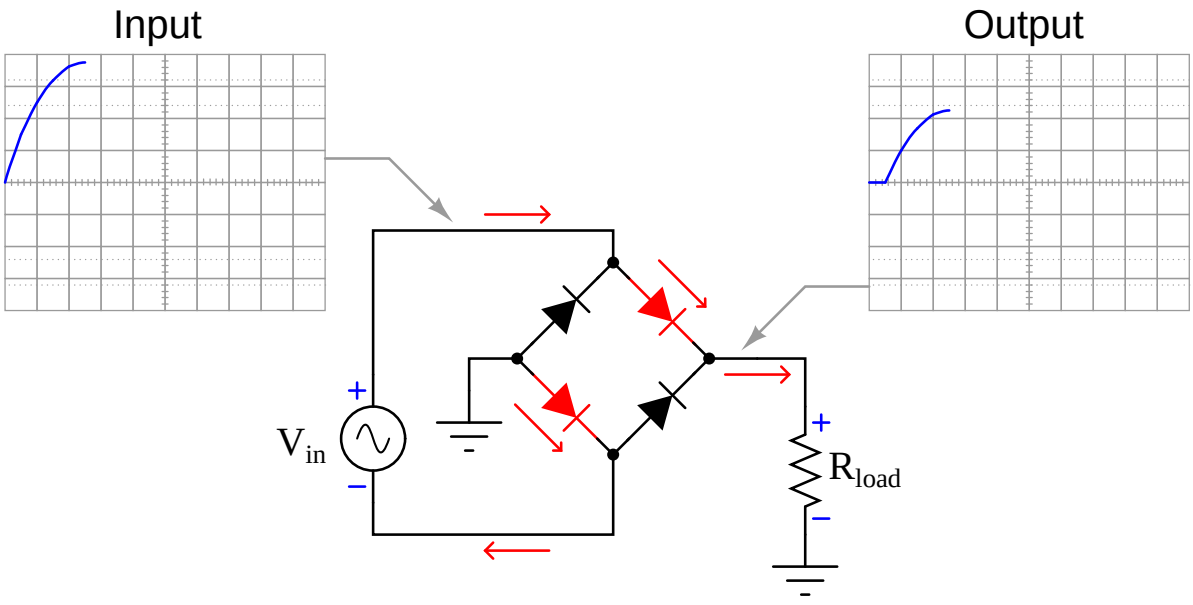

Input
Output
V_{in}
R_{load}

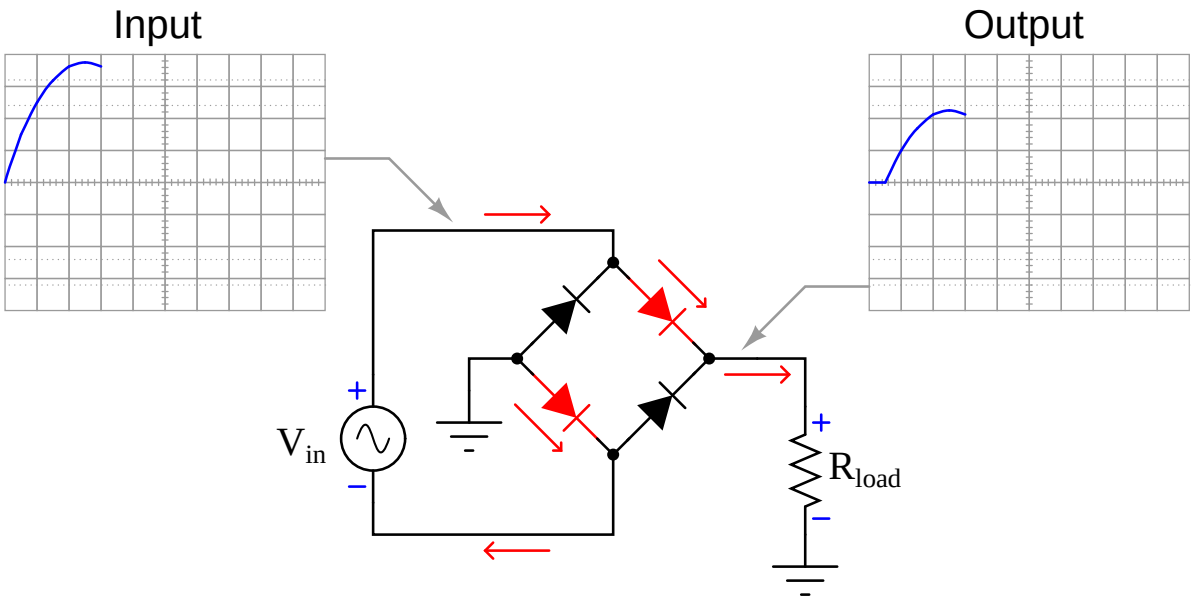

Input
Output
+
V_{in}
−
R_{load}

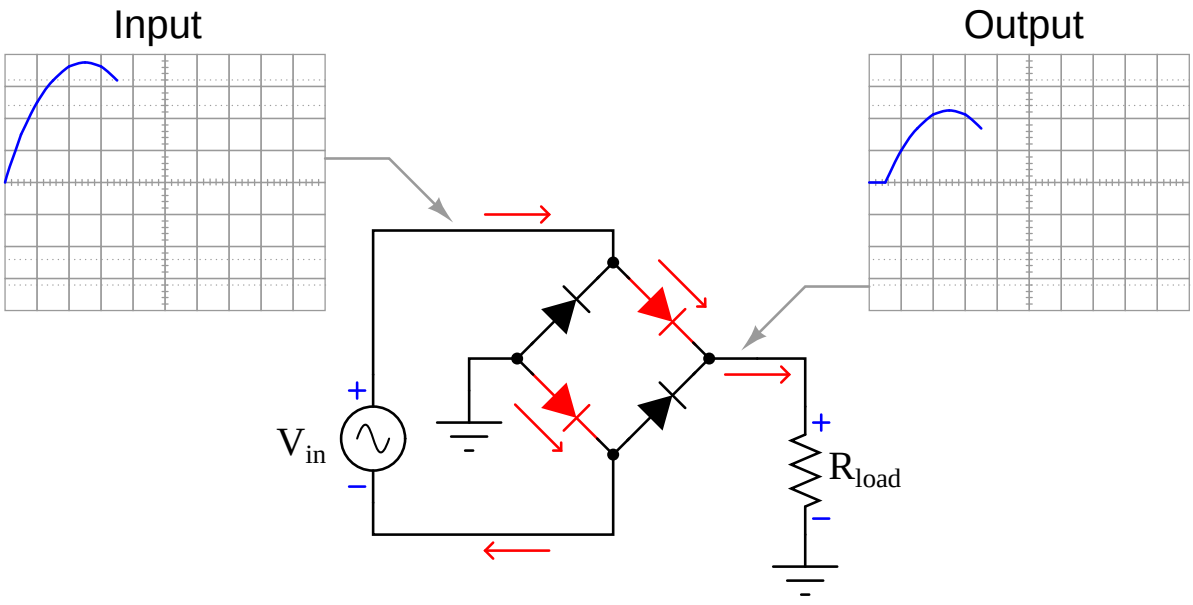

Input
Output
+
V_{in}
−
+
R_{load}
−

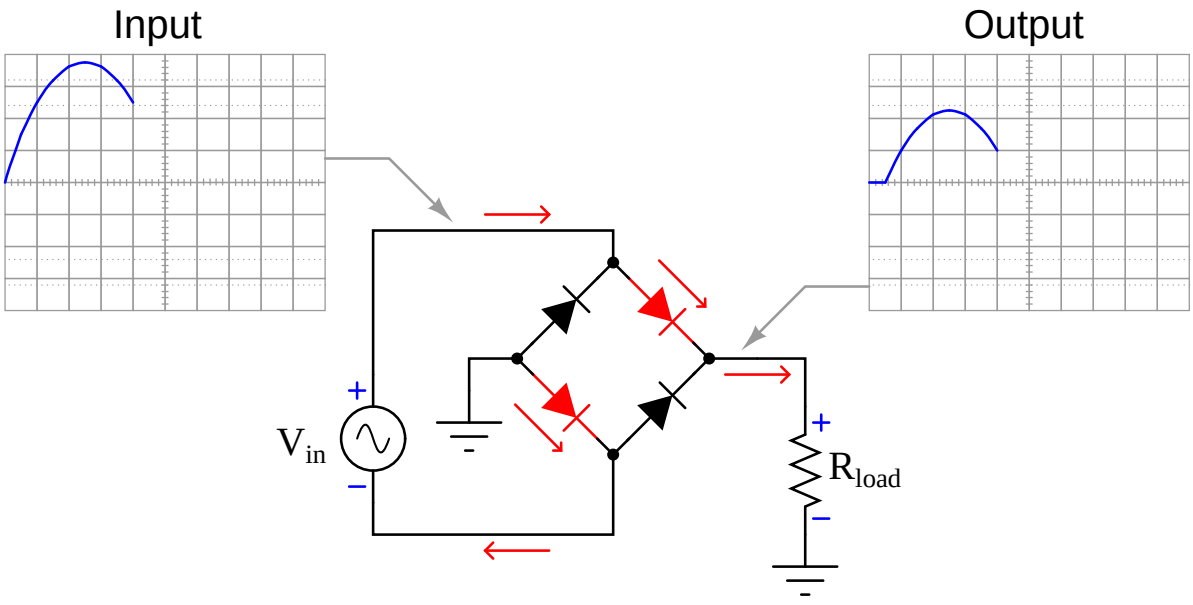

Input
Output
+
V_{in}
−
+
R_{load}
−

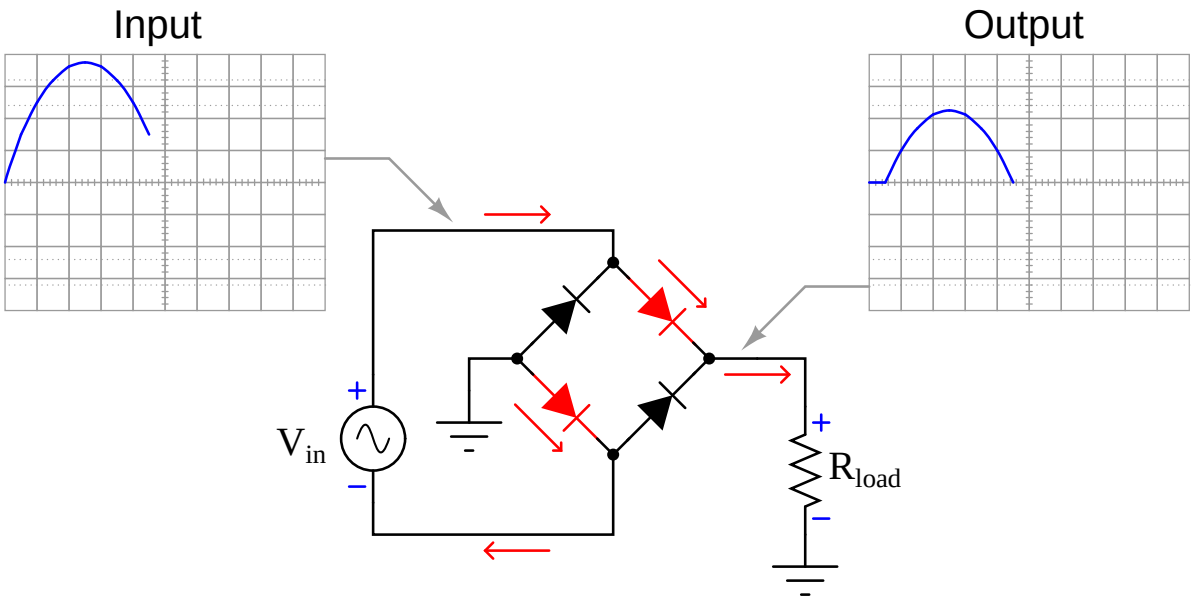

Input
Output
+
V_{in}
−
+
R_{load}
−

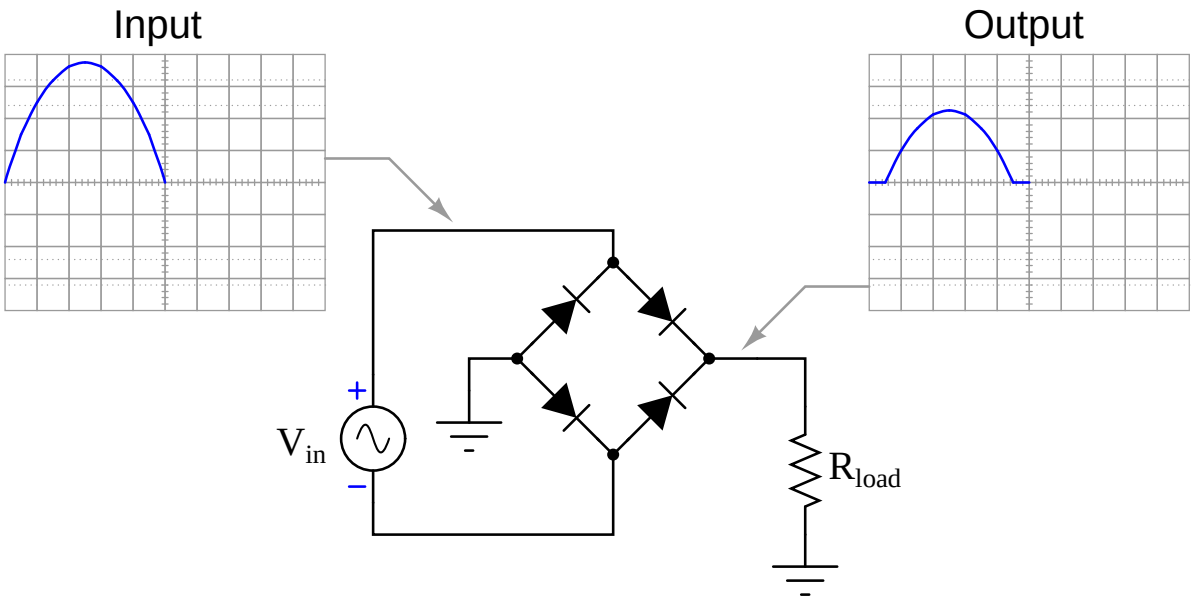

Input
Output
+
V_{in}
−
+
R_{load}
−

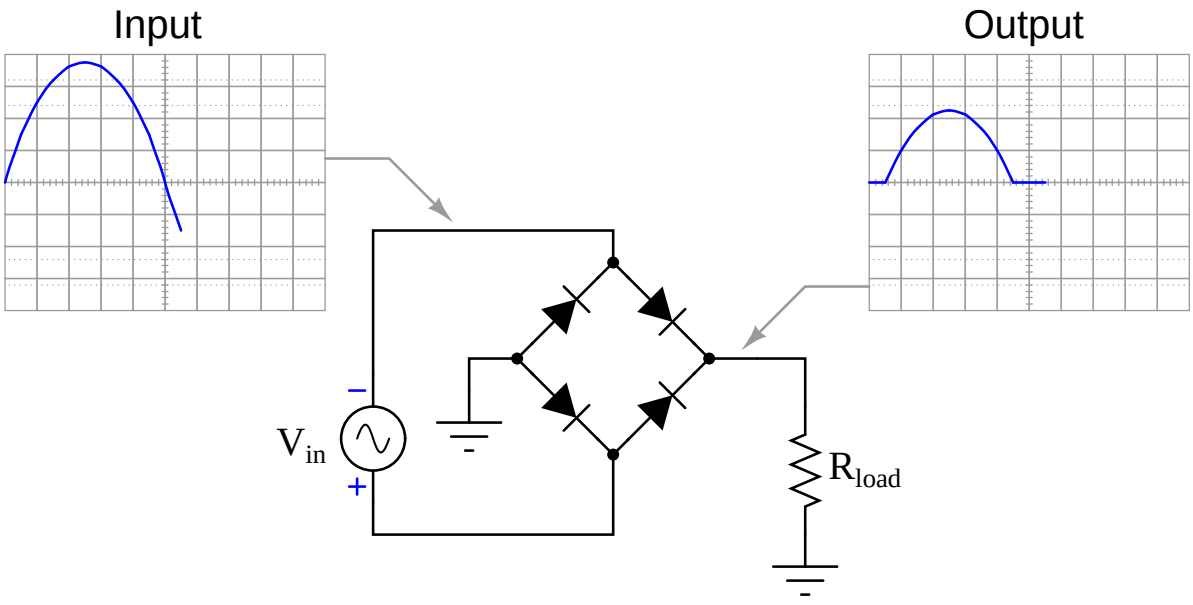

Input
Output
+
V_{in}
−
+
R_{load}
−

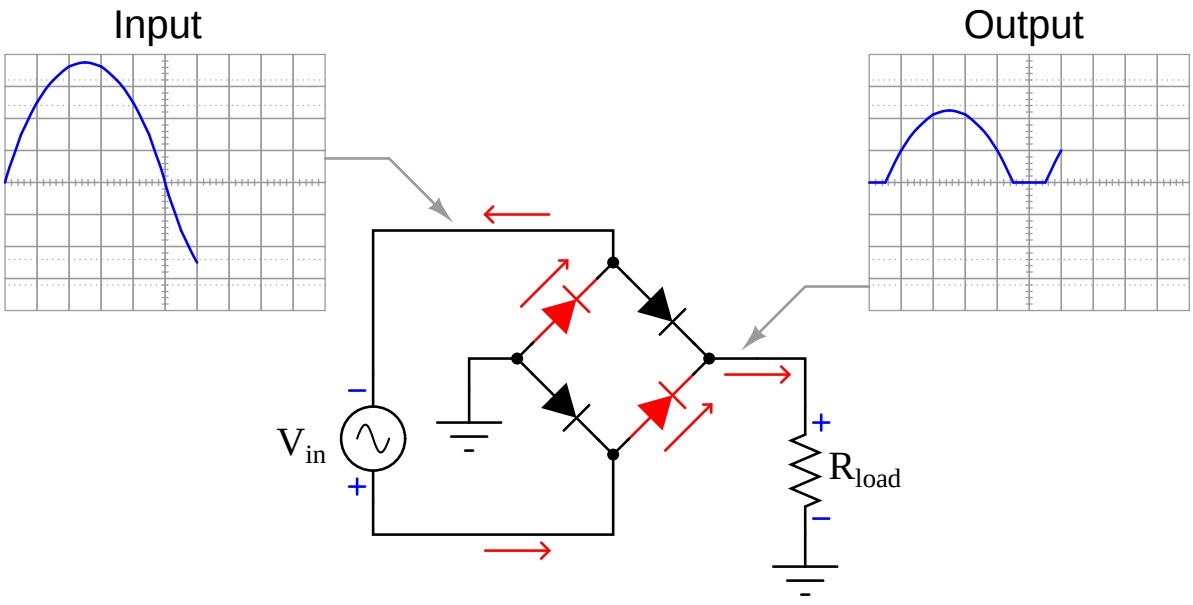

Input
Output
+
V_{in}
−
+
R_{load}
−

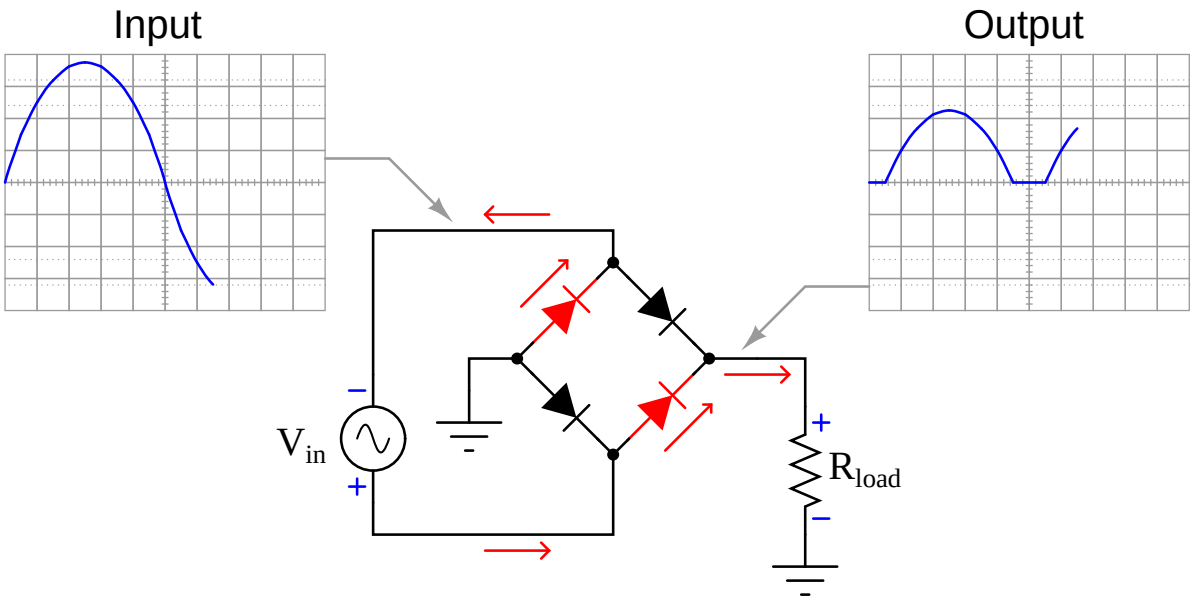

Input
Output
+
V_{in}
−
+
R_{load}
−

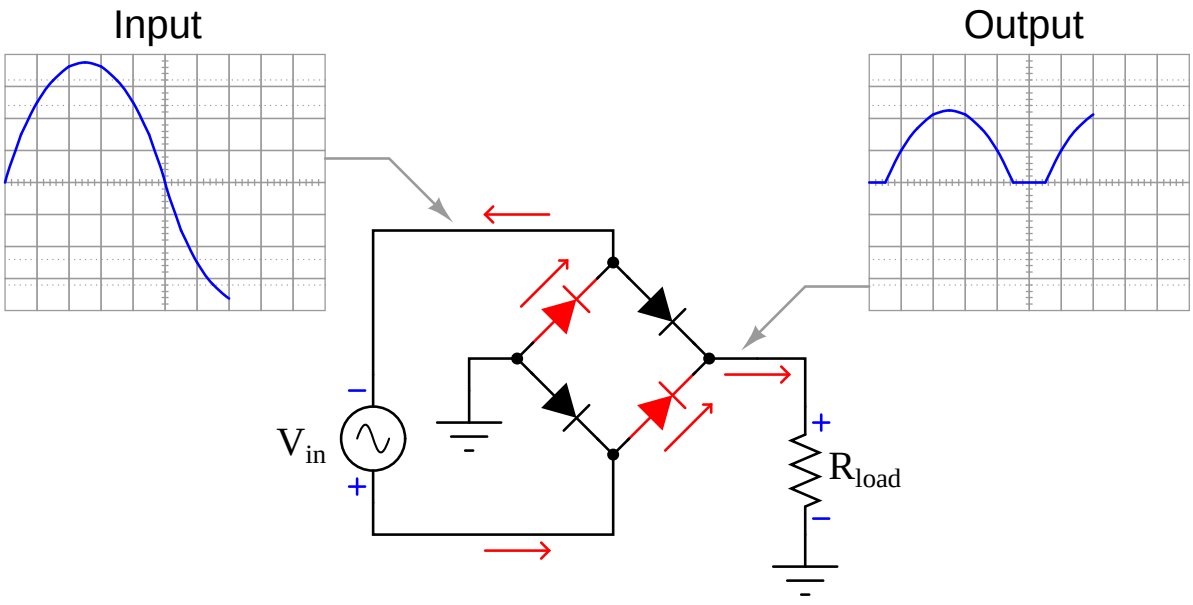

Input
Output
+
V_{in}
−
+
R_{load}
−

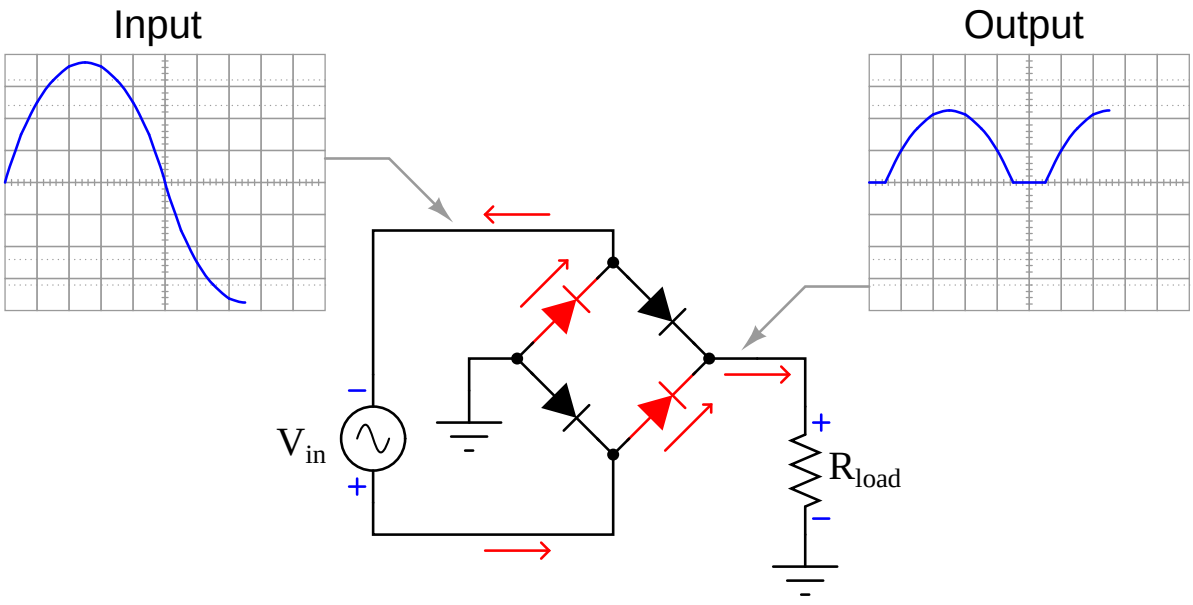

Input
Output
+
V_{in}
−
R_{load}

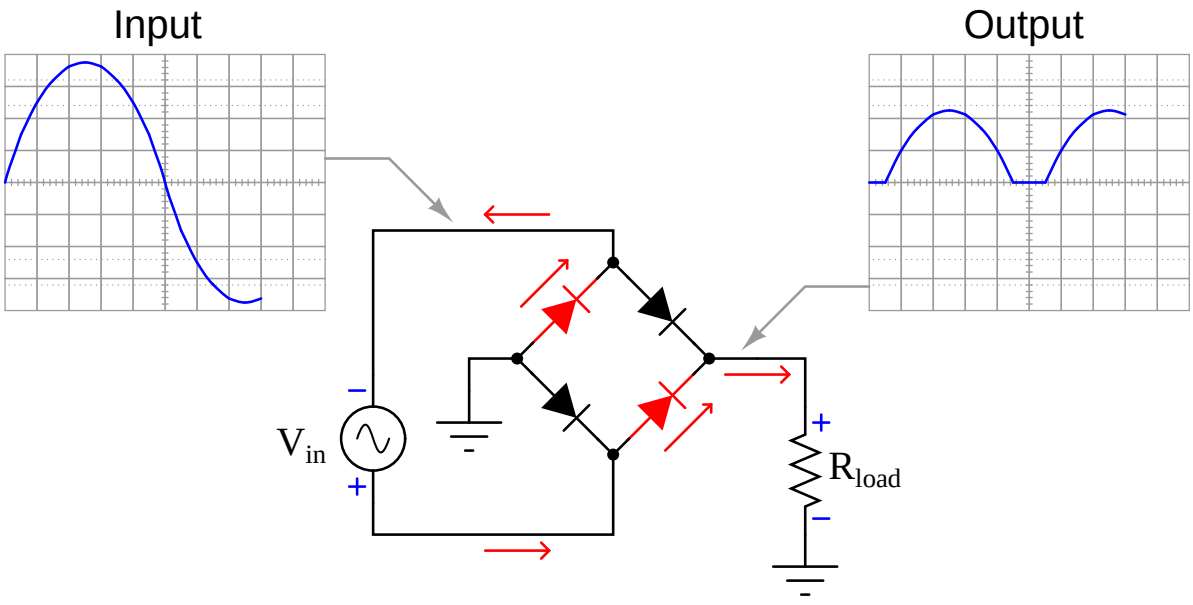

Input
Output
−
V_{in}
+
R_{load}

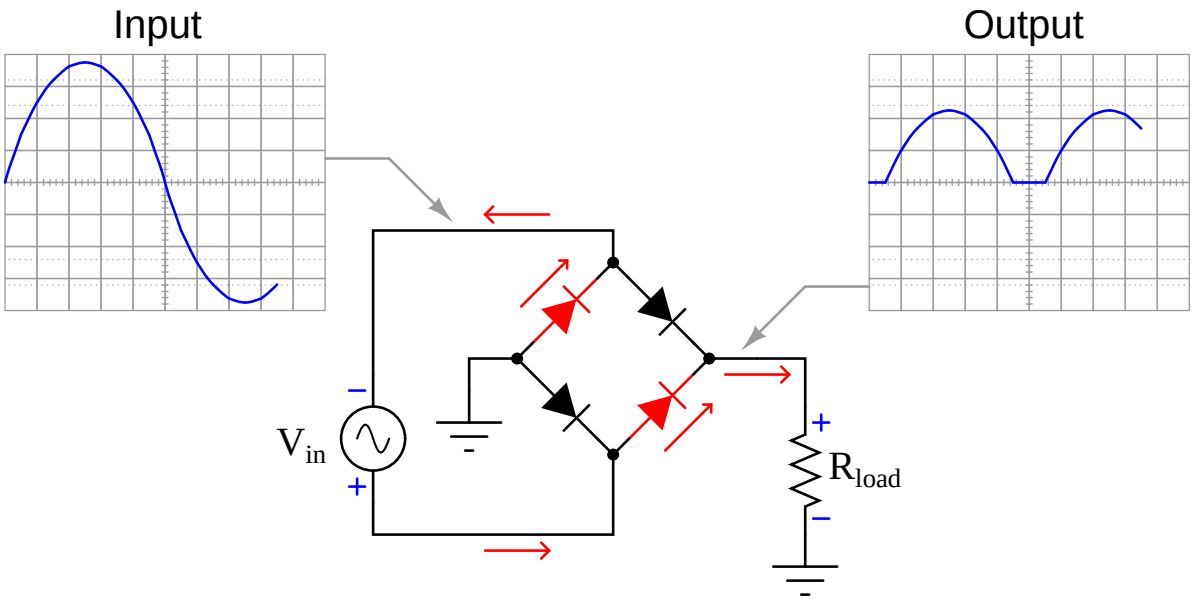

Input
Output
V in
R load

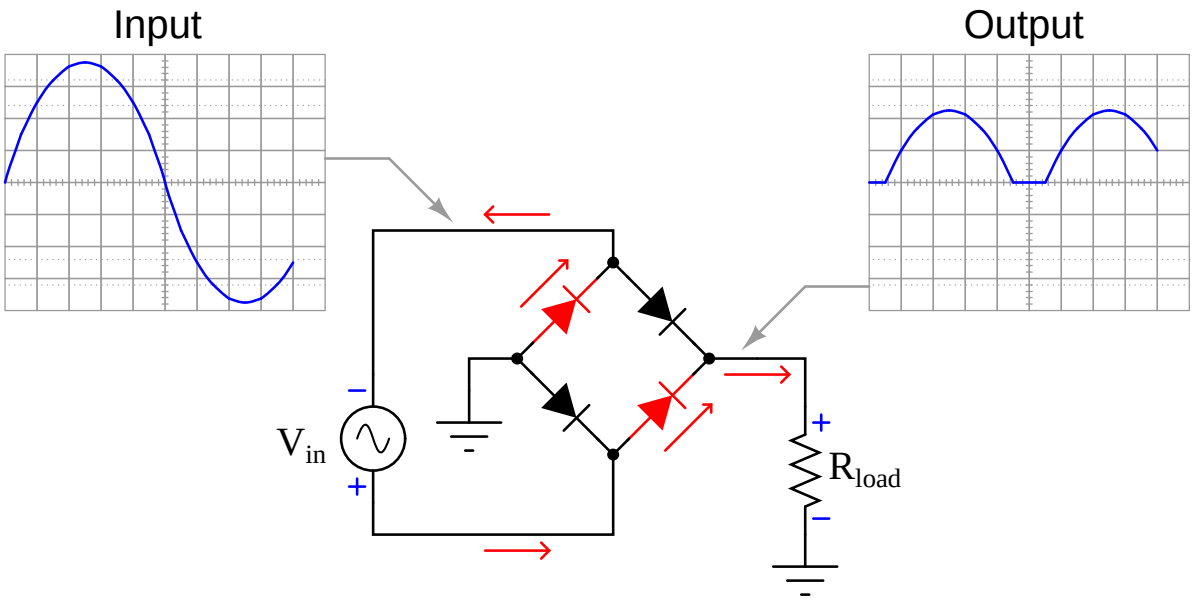

Input
Output
V in
R load

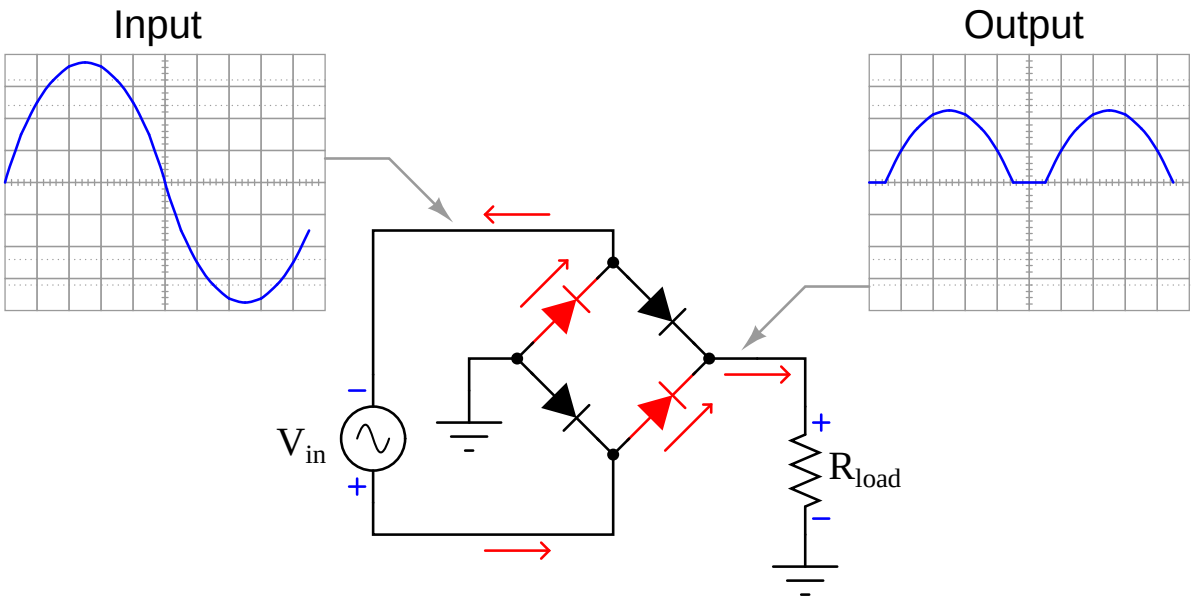

Input
Output
V in
R load

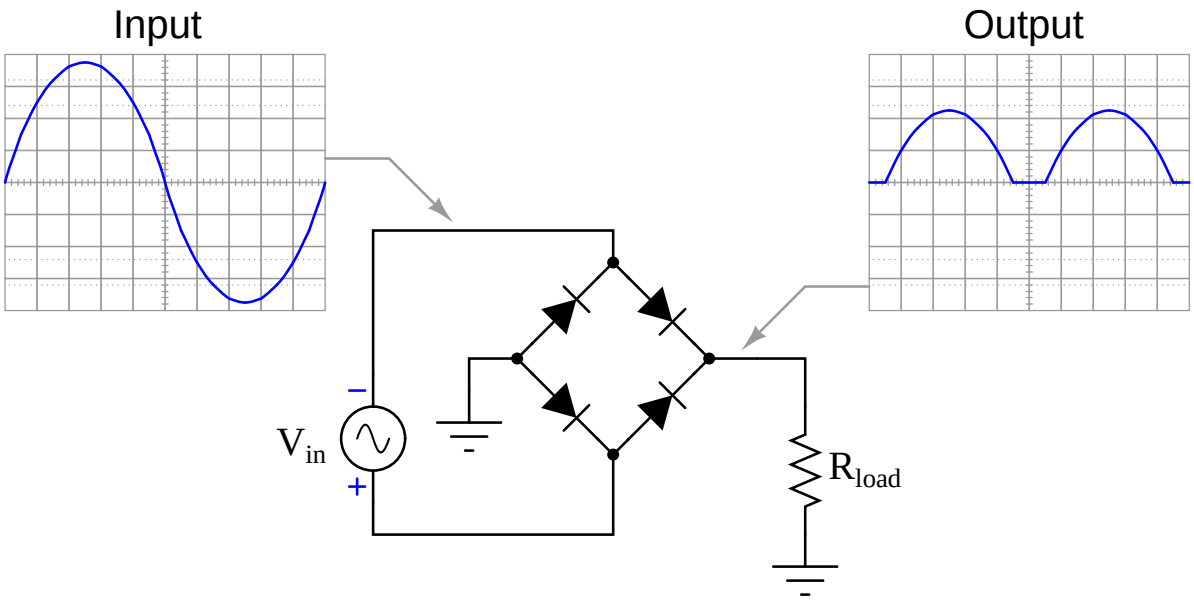

Input
Output
V in
R load


Input
Output
V in
R load


Input
Output
V in
R load


Input
Output
V in
R load


Input
Output
V in
R load



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Answer 1

Note that the diodes' forward voltage drops create "dead zones" in the output waveform. This is one of the reasons that calculation of a rectifier circuit's effective DC output voltage is complicated: it is not a straightforward task to predict how wide these dead zones are, and to quantify the effect they have on the output voltage.

Notes 1

The purpose of this animation is to let students study the behavior of this amplifier circuit and reach their own conclusions. Similar to experimentation in the lab, except that here all the data collection is done visually rather than through the use of test equipment, and the students are able to "see" things that are invisible in real life.