

LAB #03-A

Objectives

To calculate and draw the DC output voltages of half-wave rectifiers.

Theory

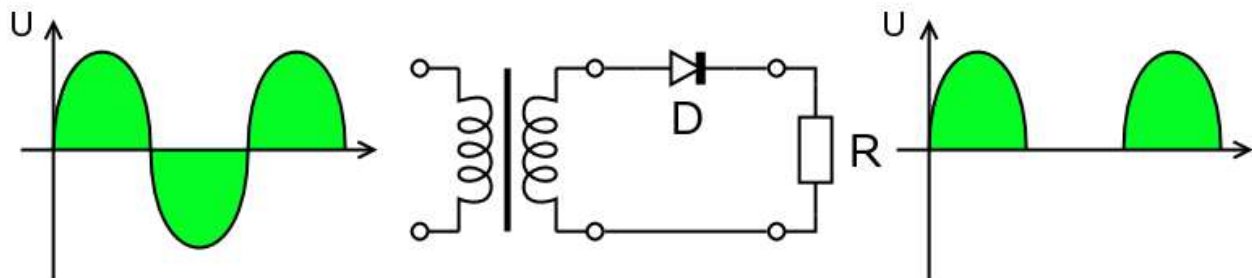
Rectifiers

A **rectifier** is an electrical device that converts alternating current (AC) to direct current (DC), a process known as **rectification**. Rectifiers have many uses including as components of power supplies and as detectors of radio signals. Rectifiers may be made of solid state diodes, vacuum tube diodes, mercury arc valves, and other components.

Half-wave rectification

In half wave rectification, either the positive or negative half of the AC wave is passed, while the other half is blocked. Because only one half of the input waveform reaches the output, it is very inefficient if used for power transfer. Half-wave rectification can be achieved with a single diode in a one-phase supply, or with three diodes in a three-phase supply.

The output DC voltage of a half wave rectifier can be calculated with the following two ideal equations.



Preparatory Exercise

Q1) What is half wave rectifier?

Requirement

Instruments

1. Transformer/ Function Generator
2. Digital Multi-meter (DMM)
3. Oscilloscope

Components

1. Diode : Silicon (D1N4002)
2. Resistors: 2.2k Ω , 3.3k Ω

Procedure

Half Wave Rectification

1. Construct the circuit of *Fig. 3.1*. Set the supply to 6 V p-p sinusoidal wave with the frequency of 600 Hz. Put the oscilloscope probes at function generator and sketch the input waveform obtained.
2. Put the oscilloscope probes across the resistor and sketch the output waveform obtained. Measure and record the DC level of the output voltage using the DMM.

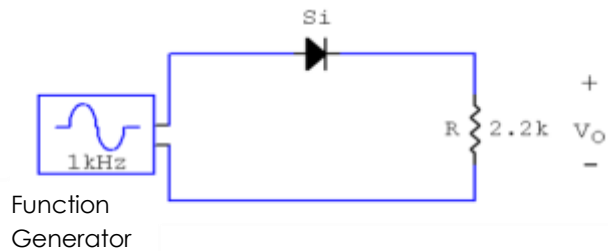


Fig. 3.1

3. Reverse the diode of circuit of *Fig. 3.1*. Sketch the output waveform across the resistor. Measure and record the DC level of the output voltage.
4. Comment on the results obtained from step 2 and 3.

Observation

Results and Calculations

1. Input waveform, V_i



2. Output waveform, V_o



DC level of V_o (measured) = _____

Reversed Bias Diode

3. Output waveform, V_o



DC level of V_o (measured) = _____

Calculation

Result