Lab: Familiarization with Signals & the Oscilloscope

Physics

Objective: The objective of this lab is to gain familiarization with the oscilloscope – a test instrument for observing electromagnetic signals.

As a secondary objective, you will examine the characteristics of a semiconductor diode. The diode is an electronic device that allows current to flow in only one direction.

Materials:
Oscilloscope with probe
Signal generator with output cable
1 kΩ resistor (color code is brown-black-red-gold)
Diode
Jumper wire (with alligator clips)

Procedure:
1. Connect the signal generator to the 1 kΩ resistor and the oscilloscope as shown in the diagram below.

2. Power on all the equipment.
3. Set the signal generator to approximately 2 kHz.
4. Adjust the oscilloscope to see at least 2 or 3 complete cycles of the wave. Use the following controls:

   - Channel 1 volts/div
   - Time/Div
   - Channel 1 position
   - Horizontal Position

5. Calculate the period for a 2500 Hz signal. ___________________
6. Observing the signal on the oscilloscope, adjust the signal generator until you have a 2500 Hz signal on the screen. The signal should have an amplitude of at least 5 volts. Have the teacher check your signal. _______
7. Sketch the waveform on the first graph using a colored pencil. Be sure to record the horizontal and vertical scale from the oscilloscope.

8. Without changing the settings on the signal generator, use the jumper wire (with alligator clips), to insert the diode into the circuit. See the figure below. Be sure to pay attention to the correct polarity on the diode.

9. Sketch the waveform on the second graph using a colored pencil. Be sure to record the horizontal and vertical scale from the oscilloscope.

**Question**: Explain the affect that inserting the diode had on your circuit.
(1) Sketch the waveform below.

(2) Sketch the waveform of the diode circuit below.