Physical Experiments I

Pre-lab Assignment

Oscilloscope

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Date Performed:

Score

Answers to Questions (20 points)

(1)The core of an analog oscilloscope is a special type of vacuum tube known as a cathode ray tube(CRT). What goes on inside the tube to produce waveform displays on the screen?

How the waveform is displayed in such kind is the existence of two pairs of amplifiers, vertical amplifier and horizontal amplifier. After the electron flow have been produced by the electron gun, it will pass through those two pairs of amplifiers, respectively, which allow the electron to hit the screen and observed by us.

One of the important component is the vertical amplifier. It amplifies the input signal to the vertical deflection plates which means that the small amplitude input signals produce an observable deflection of the electron beam.

The other one is the horizontal amplifier, it amplifies the input signal or the saw tooth voltage before it is applied to the horizontal deflection plates and being displaced on the screen.

The saw tooth voltage generator provides the saw tooth voltage which can cause the electron beam move from left to right at a constant speed. The saw tooth voltage may be synchronized with a respective vertical input voltage.

(2) When measuring AC voltage signals, what do the two axes (horizontal and vertical) of the oscilloscope screen represent?

X--The horizontal axis of the oscilloscope represents the scanning time.

Y--The vertical axis represents the value of voltage of the input signal.

(3) Explain how Lissajous pattern are displayed?

We need to input two sine signal to the CH1 and CH2. These two signal are connected to a horizontal axis and a vertical axis (X-Y mode), respectively. These two sine signal have the same integral frequency ratio.

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