5.3 Determining frequency and amplitude of a wave using an oscilloscope

Introduction

In this experiment you will be determining the frequency and amplitude of a signal using an oscilloscope.

You are expected to be familiar with the terminology of “volts per centimetre” and time-base as the descriptors for the scales of the display.

You are also expected to be able to interpolate between markings to determine the most precise value.

You should also be familiar with the formula linking frequency and period.

Aims

- To be able to use an oscilloscope

Intended class time

- 30 to 45 minutes

Equipment

- signal generator
- oscilloscope
- leads
- microphone
- loudspeaker
- musical instrument

Procedure (working in pairs)

1. Set up the apparatus connecting the output of the signal generator to a loudspeaker and to an input of the oscilloscope.
2. Arrange the equipment such that one student can see the face of the signal generator and the other cannot.
3. The first student sets the signal generator at their chosen setting.
4. The second student then uses the oscilloscope to determine both the frequency and amplitude of the signal.
5. Exchange places and repeat processes 3 to 4.
6. Using the microphone as a source for the oscilloscope, work in your pair to determine the frequency of a note from a musical instrument.

Extension Opportunities

7. For your signal generator does the amplitude of the wave-form remain constant as frequency is varied? Document your investigation.

Recording

As evidence for the Practical Endorsement you should have evidence of your measurements. All work should be clearly dated.

In addition, in preparation for the assessment of practical work in the written examinations and to help you develop your understanding, you should:

- have used the data collected to calculate a value for the frequency and amplitude, explaining clearly how you have used the data in the calculation and showing all working.
- for the extension work, detail how you set about your investigation. Document any measurements taken and use these to substantiate your conclusion.