

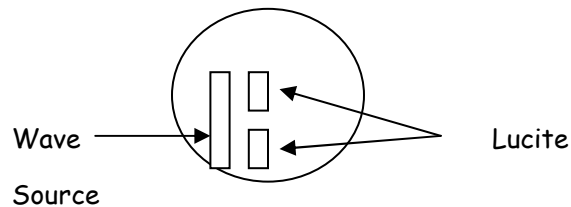
Lab - Waves

Purpose - to use a variety of wave sources to observe the behavior of waves and to illustrate the relation between frequency and wavelength.

Procedure -

Station A - *Straight Wave Source and Ripple Tank*. The apparatus assembled consists of a mechanical wave generator with a wood slat to generate straight waves. The motor runs on direct current.

- 1.) Connect the lead to the 4.5 volt output of the power source and then hold the light bulb approximately 30 – 60 cm above the ripple tank until the waves can be seen clearly below.
- 2.) Sketch the shape of the waves. (1)
- 3.) Decrease the voltage by turning the dial on the resistor (rheostat), this causes the motor to run at lower cycles per second.
- 4.) Record the changes in wavelength. (1)
- 5.) Insert the two Lucite blocks as shown below, sketch the interference pattern shown behind the blocks. (1)



- 6.) Unplug all apparatus and remove the Lucite blocks.

Station B - *Oscilloscope and Frequency Generator*. The apparatus assembled consists of an electrical wave generator connected to the oscilloscope. The oscilloscope reads the electrical signal and displays it visually on the screen.

- 1.) Plug in both the wave generator and oscilloscope.
- 2.) The display on the 'scope shows the + and - oscillations of the electric wave sent from the wave generator.
- 3.) Accurately sketch the wave, showing the grid from the 'scope. (1)
- 4.) Change the frequency on the wave generator from 1000 Hz to 2000 Hz by turning the large knob on the left of the apparatus.
- 5.) Accurately sketch the new display on the 'scope.

- 6.) Change the frequency back to 2000 Hz. Now change the volts per div on the oscilloscope by dialing it up (clockwise) one notch.
- 7.) Accurately sketch the new display. (1)
- 8.) Set the volts per div back to the original dot.

Station C - Standing Wave generator.

WEAR EYE PROTECTION.

- 1.) Accurately record the distance between the motor and the other fixed end. (1)
- 2.) Plug in the motor and sketch the stable standing wave produced, show nodes and anti-nodes. (3)
- 3.) Determine and record the wavelength. (1)

Station D - Wave table.

- 1.) Generate a pulse on the table and sketch both it and the reflected pulse. (2)
- 2.) Develop a standing wave and sketch it. Label which multiple of the fundamental frequency it is. (2)

Discussion -

- 1.) How did changing the voltage at Station A affect the frequency? (1)
- 2.) How did this change in frequency affect the wavelength? (1)
- 3.) What is the name of the interference pattern shown at Station A when using the Lucite? (1)
- 4.) Was the result of decreasing frequency at Station B in agreement to your answer to #2? Explain how. (1)
- 5.) What wave property was affected by altering the vertical gain at Station B? (1)
- 6.) What is the frequency of the wave at Station D (answer in multiples of the fundamental frequency)? (1)

Conclusion - Answer the purpose. (2)