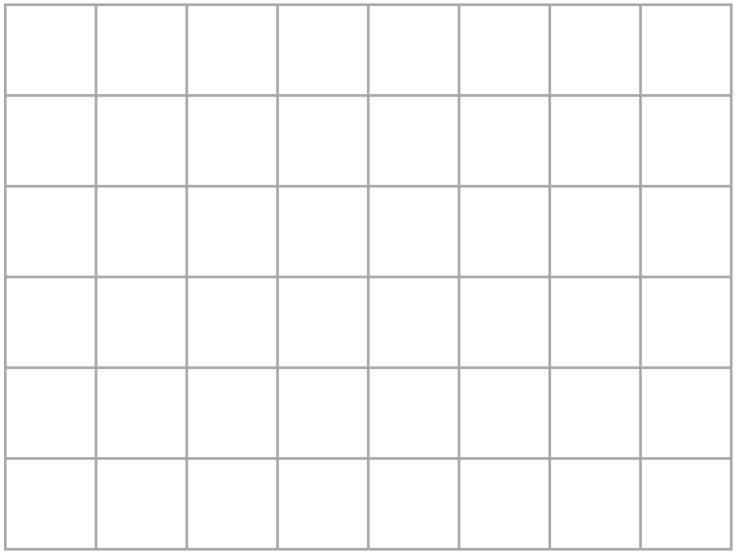
9 An oscilloscope can be used to determine the frequency of a sound wave.

(a) Give the name of the piece of apparatus that must be connected to the oscilloscope to detect the sound wave.

(1)

.....

(b) The diagram shows the screen of the oscilloscope and the oscilloscope settings.



oscilloscope settings:

y direction: 1 square = 2 V
x direction: 1 square = 0.001 s

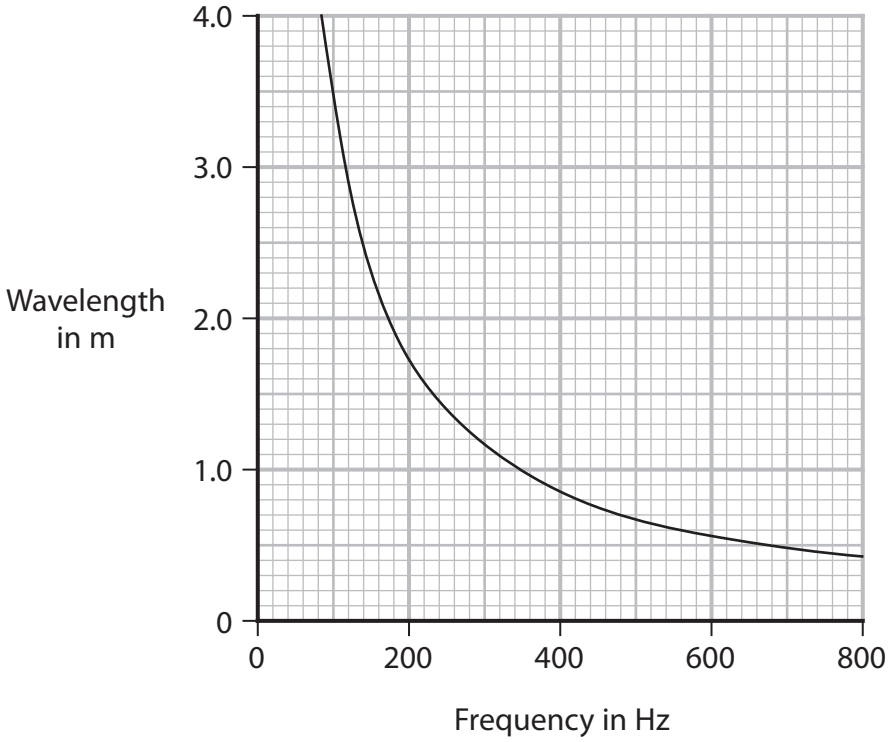
A sound wave of frequency 250 Hz is detected.

The sound wave produces a trace on the oscilloscope of amplitude 4 V.

Complete the diagram by drawing the trace of this sound wave on the oscilloscope screen.

(5)

(c) The graph shows how the wavelength of sound waves in air varies with their frequency.



If wavelength and frequency are inversely proportional, then

wavelength × frequency = constant

Using the graph, evaluate whether the wavelength of sound waves in air is inversely proportional to their frequency.

(3)

(Total for Question 9 = 9 marks)

TOTAL FOR PAPER = 70 MARKS