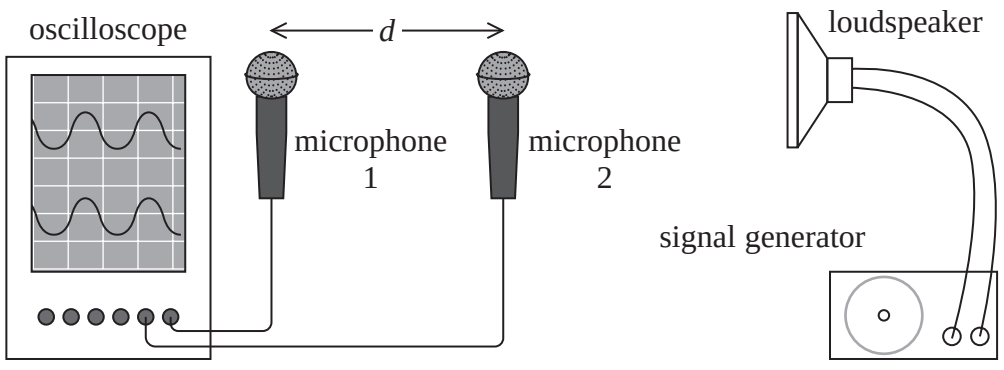
6 In an experiment to determine the speed of sound in air a student connected two microphones to an oscilloscope, as shown.



The microphones detect sound from the loudspeaker, converting it to an electrical signal. The signal is displayed on the oscilloscope screen.

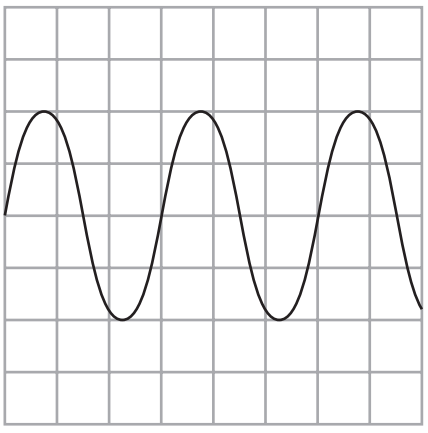
Both microphones were initially positioned the same distance from the loudspeaker. The two signals were in phase on the oscilloscope screen. The student slowly moved microphone 2 towards the loudspeaker, until the two signals on the oscilloscope were in phase again. He then measured the distance d between the microphones to determine the wavelength λ of the sound waves.

$d = 20.5\,\text{cm}$

(a) Comment on the student's experimental technique to determine λ.

(2)

(b) The oscilloscope trace for the signal from microphone 1 is shown below.



The time base of the oscilloscope was set to $0.20\,\text{ms}\,\text{div}^{-1}$.

Determine a value for the speed of sound in air.

(5)

Speed of sound = ...

(Total for Question 6 = 7 marks)