

Sound Multiple Choice

Q1.

In which of the following frequency ranges is ultrasound found?

- A 1 Hz – 1 kHz
- B 2 kHz – 10 kHz
- C 11 kHz – 20 kHz
- D 21 kHz – 30 kHz

Q2.

A trumpet and a flute are played by two students. The note from the trumpet is louder and has a lower pitch than the note from the flute.

How do the amplitude and frequency of the sound from the trumpet compare to the amplitude and frequency from the flute?

trumpet's amplitude

trumpet's frequency

A larger

higher

B larger

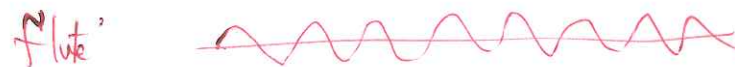
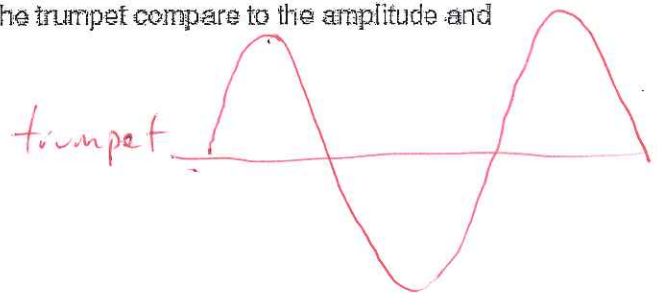
lower

C smaller

higher

D smaller

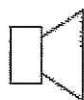
lower



Q3.

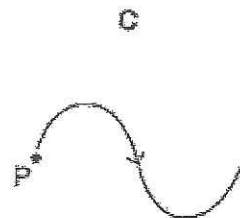
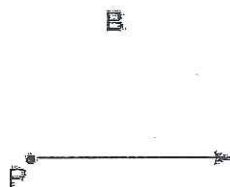
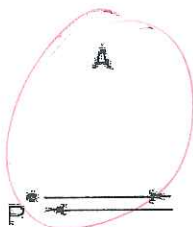
The diagram shows a loudspeaker that is producing a continuous sound wave of frequency 200 Hz in air.

loudspeaker



*P

Which diagram best shows how the sound causes a molecule at P to move during $\frac{1}{200}$ s?



200 wave/s \therefore

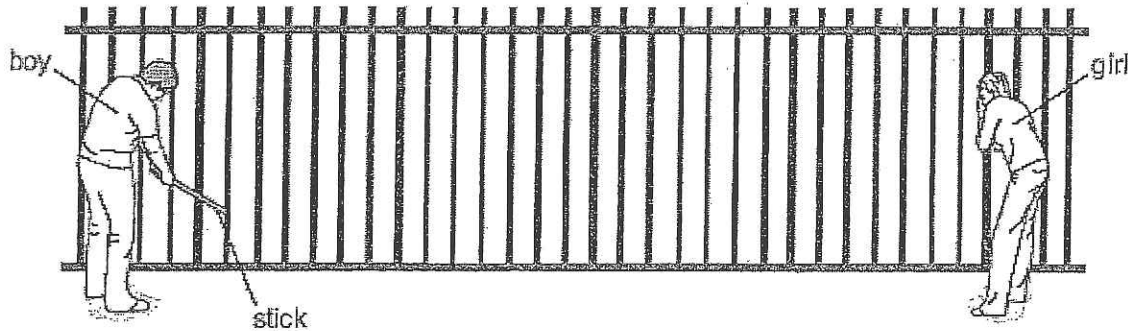
in $\frac{1}{200}$ s = 1 wave

1

(\rightleftarrows) (see phet simulation)

Q4.

A boy strikes a rigid metal fence with a stick to create a sound along the fence. A girl listens with her ear against the fence. One second after the fence is struck, the girl hears a sound through the air.

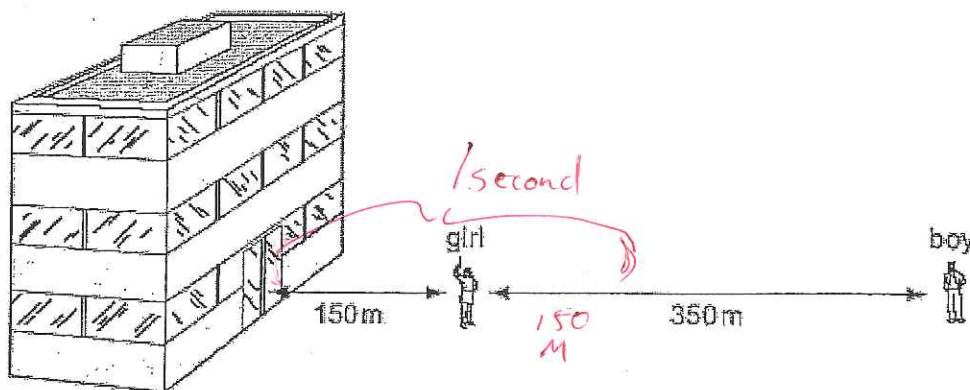


How long will it take for the sound to reach the girl through the fence?

- A 0 second
- B less than 1 second
- C 1 second
- D more than 1 second

Q5.

A girl, standing 150 m in front of a tall building, fires a shot using a starting pistol. A boy, standing 350 m from the girl, hears two bangs 1 s apart.



From this information, what is the speed of sound in air?

- A 300 m/s
- B 350 m/s
- C 500 m/s
- D 650 m/s

Q6.

An ultrasonic tape-measure is used to find the distance to a wall. It sends out an ultrasonic pulse and times how long it takes for the reflected pulse to return from the wall.

The ultrasound has a frequency, a wavelength and a speed.

Which pair of values is needed to find the distance to the wall?

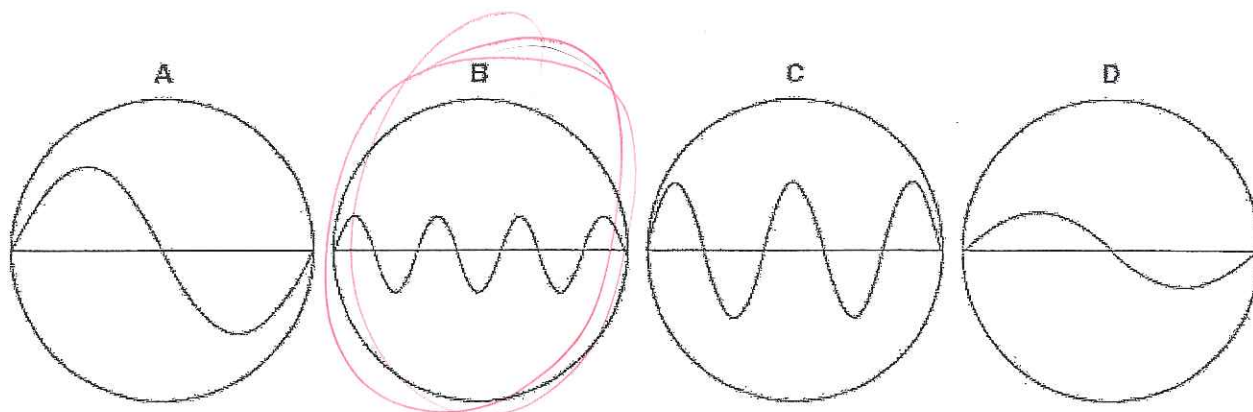
$$d = s \cdot t$$


- A frequency and wavelength
- B frequency and time taken for the pulse to return
- ☒ C speed and time taken for the pulse to return
- D wavelength and time taken for the pulse to return

Q7.

The diagrams represent sound waves displayed on an oscilloscope.

Assuming the controls of the oscilloscope remain the same for each sound, which diagram represents the quietest sound with the highest frequency?



Q8.

Which of the following does not produce a sound wave?

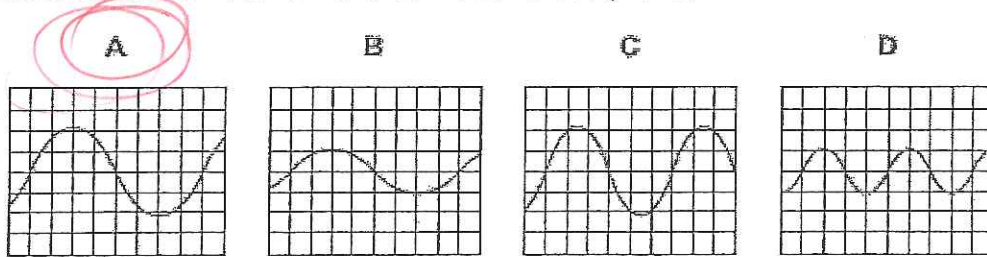
- A a bell ringing under water
- B a gun fired in a room with no echoes
- C a hammer hitting a block of rubber
- ☒ D an explosion in outer space

(See 2001 space odyssey clip!)
+ Star wars clip!

Q9.

The diagrams show oscilloscope traces of sounds picked up by microphones. The oscilloscope controls are set in the same position for all the traces.

Which trace shows the sound that is both loud and low-pitched?



Q10.

A flash of lightning and the corresponding thunder clap are detected 6 s apart. It is calculated that the lightning struck about 1800 m away.

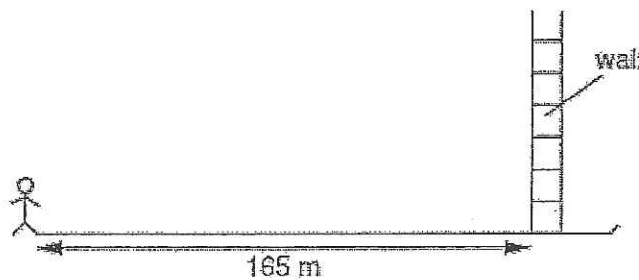
On which assumption is the calculation based?

- ☒ A Light reaches us almost instantaneously, but sound travels at 300 m/s.
- ☐ B Light travels 300 m/s faster than sound.
- ☐ C Sound reaches us almost instantaneously, but light travels at 300 m/s.
- ☐ D The sound of the thunder was emitted 6 s after the flash.

$$s = \frac{d}{t} = \frac{1800 \text{ m}}{6 \text{ s}} = 300 \text{ m/s}$$

Q11.

The diagram shows a student standing 165 m in front of a wall. He claps his hands once.



How long after the handclap does he hear the echo?
[The speed of sound in air is 330 m/s.]

- ☐ A 0.25 s
- ☐ B 0.50 s
- ☒ C 1.0 s
- ☐ D 2.0 s

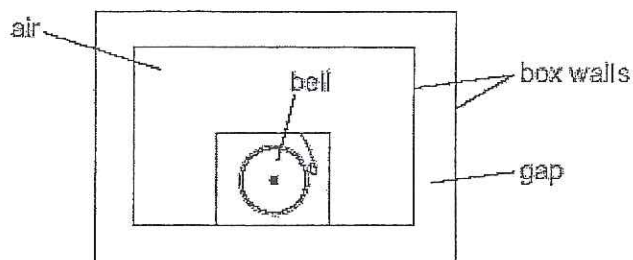
$$\begin{array}{c} d \\ \hline s \quad t \end{array}$$

$$d = 165 \times 2 = 330 \text{ m}$$

$$t = \frac{d}{s} = \frac{330 \text{ m}}{330 \text{ m/s}} = 1 \text{ s}$$

Q12.

A battery-operated bell is surrounded by a box with double walls.



The bell is ringing but no sound at all is heard outside the box.

What is in the gap?

- A a solid
- B a liquid
- C a gas
- D a vacuum

Q13.

In a test, a car horn is found to be too loud and the pitch of the note is too high. What information does this give about the amplitude and the frequency of the sound wave produced?

	amplitude	frequency
<u>A</u>	<u>too large</u>	<u>too large</u>
B	too large	too small
C	too small	too large
D	too small	too small

Q14.

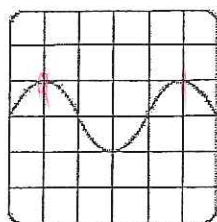
Sounds are made by vibrating objects. A certain object vibrates but a person nearby cannot hear any sound.

Which statement might explain why nothing is heard?

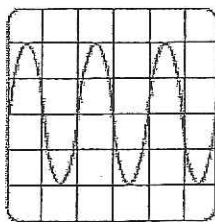
- A The amplitude of the sound waves is too large.
- B The frequency of the vibration is too high.
- C The sound waves are transverse.
- D The speed of the sound waves is too high.

Q15.

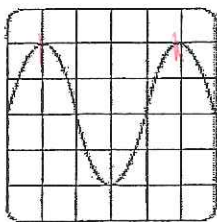
Four sound waves W, X, Y and Z are displayed by an oscilloscope screen. The oscilloscope settings are the same in each case.



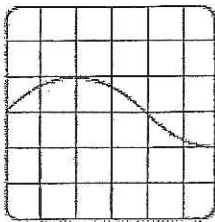
W



X



Y



Z

Which two sounds have the same pitch?

A W and X

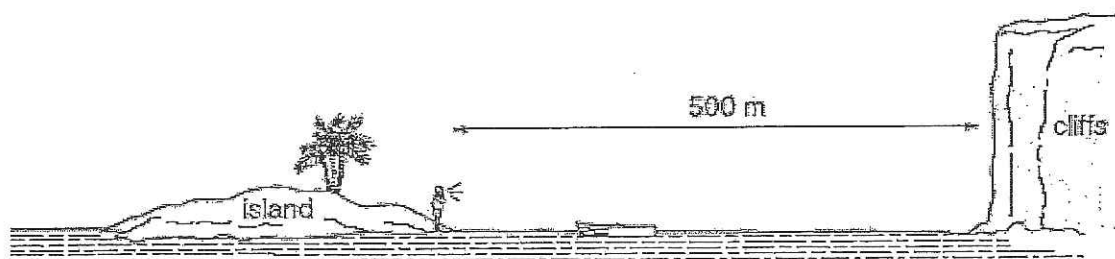
B W and Y

C X and Y

D X and Z

Q16.

A boy is stranded on an island 500 m from the shore.



He shouts for help, but all he can hear in reply is the echo of his shout from some cliffs.

Sound travels at 340 m/s through the air.

What is the time interval between the boy shouting and hearing the echo?

A $\frac{500}{340} \text{ s}$

B $\frac{2 \times 500}{340} \text{ s}$

C $\frac{340}{500} \text{ s}$

D $\frac{2 \times 340}{500} \text{ s}$

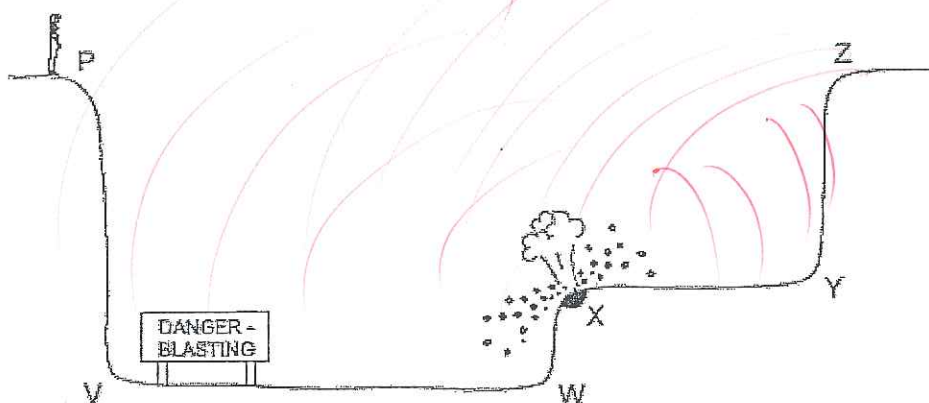
$\therefore \frac{1000 \text{ m}}{340 \text{ s}}$

$t = \frac{d}{s}$

$t = \frac{d}{s}$

Q17.

An engineer standing at P hears the sound of an explosion at X.



After the explosion, she hears two bangs. One bang is heard a fraction of a second after the other.

The second bang is an echo from

A XY.

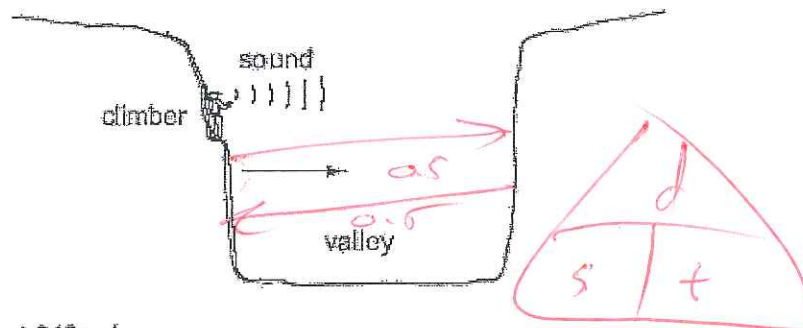
B FV.

C ZY.

D WX.

Q18.

To estimate the width of a valley, a climber starts a stopwatch as he shouts. He hears an echo from the opposite side of the valley after 1.0 s.



The sound travels at 340 m/s.

What is the width of the valley?

A 85m

B 170m

C 340m

D 680m

$$d = s \cdot t$$

$$= (340)(0.5)$$

$$= 170m$$

Q19.

Which equation can be used to calculate the speed of sound?

A speed = $\frac{\text{distance}}{\text{time}}$

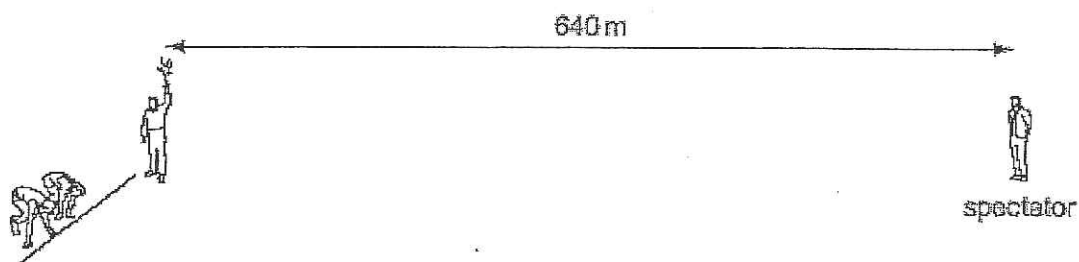
B speed = distance \times time

C speed = $\frac{\text{time}}{\text{distance}}$

D speed = time + distance

Q20.

A starting pistol is fired 640 m away from a spectator.



The spectator hears the sound of the starting pistol two seconds after seeing the flash from the gun.

What is the speed of sound in air?

- A 160 m/s **B 320 m/s** C 640 m/s D 1280 m/s

Q21.

Music is produced by the loudspeaker of a radio.

Which property of the sound wave increases when the music is made louder?

- A amplitude**
B frequency
C speed
D wavelength

Q22.

A bat is flying near a house. It makes a high-pitched sound. It hears the echo 0.5 s later. The speed of sound in air is 300 m/s.

How far away is the house from the bat?

- A 600 m B 300 m C 150 m **D 75 m**

Q23

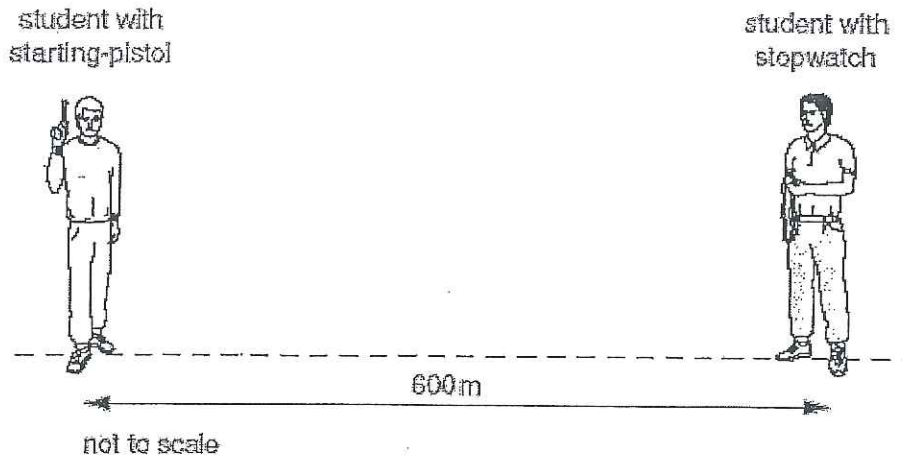
Which word correctly completes the sentence below?

An echo is a sound wave which is by a large obstacle.

- A absorbed
B dispersed
C reflected
D refracted

24.

Two students stand 600 m apart.



They find that it takes 2 seconds for the sound from the starting pistol to travel from one student to the other.

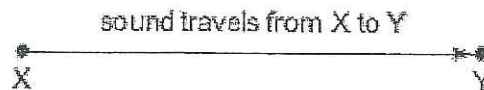
From these results, what is the speed of sound in air?

- A 150 m/s B 300 m/s C 600 m/s D 1200 m/s

$$s = \frac{d}{t} = \frac{600\text{m}}{2\text{s}} = 300\text{m/s}$$

Q25.

In an experiment to measure the speed of sound, a student uses a stopwatch to find how long a sound takes to travel from X to Y. She does this six times.



The table shows her results.

	time/s
first	0.5
second	0.7
third	0.6
fourth	0.4
fifth	0.9
sixth	0.5

Average

$$\begin{aligned} & \cancel{0.5} + 0.7 + 0.6 + 0.4 + 0.9 + \cancel{0.5} \\ & = 3.6 \\ & \div 6 \\ & = 0.6 \end{aligned}$$

What value for the time should be used to calculate the speed of sound?

- A 0.4s B 0.5s C 0.6s D 0.9s

9
512

Q26.

When the horn on a ship is sounded, the passengers hear an echo from a cliff after 4.0 s.

If the speed of sound is 340 m/s, how far away is the cliff?

- A 170m B 340m C 680m D 1360m

$$d = st$$
$$= (340 \text{ m/s}) (\frac{4}{2} \text{ s}) = 680 \text{ m}$$



Q27.

Which of the following can be heard by the human ear?

- A A whistle emitting a wave of frequency 50 kHz.
B A bat emitting a wave of frequency of 30 kHz.
C An insect emitting a wave of 300 Hz.
D A vibrating spring emitting a wave of frequency of 5 Hz.