

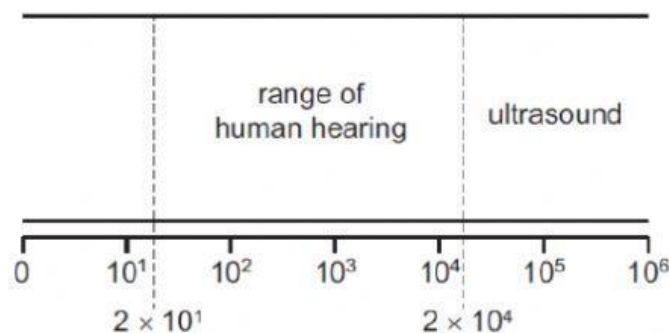
## SOUND MCQ

- 1 A dolphin has a range of audible frequencies of 150 Hz–150 kHz.

Which range of frequencies can be heard both by humans with good hearing and by dolphins?

- A 20 Hz–150 Hz
- B 20 Hz–150 kHz
- C 20 kHz–150 kHz
- D 150 Hz–20 kHz

- 2 The diagram shows the ranges of human hearing and of ultrasound waves.



To which characteristic of sound waves do the numbers on the diagram refer?

- A amplitude in cm
- B frequency in Hz
- C speed in metres/second
- D wavelength in metres

3. Both the amplitude and the frequency of a sound wave decrease.

What happens to the sound heard?

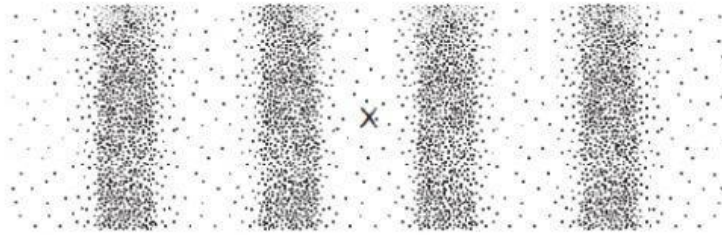
- A The sound is louder and has a higher pitch.
- B The sound is louder and has a lower pitch.
- C The sound is quieter and has a higher pitch.
- D The sound is quieter and has a lower pitch.

- 4 A siren is emitting a sound. As time passes, the sound becomes louder and higher pitched.

What is happening to the amplitude and to the frequency of the emitted sound wave?

|   | amplitude  | frequency  |
|---|------------|------------|
| A | decreasing | decreasing |
| B | decreasing | increasing |
| C | increasing | decreasing |
| D | increasing | increasing |

- 5 The diagram shows the air molecules in part of a sound wave at a particular moment in time.



Which statement is **not** correct?

- A Earlier, there was compression at X.
  - B Later, there will be a rarefaction at X.
  - C This part of the wave is travelling horizontally across the page.
  - D This part of the wave is travelling towards the top of the page.
- 6 A sound wave is travelling through water.
- What is a possible speed for the wave?
- A 150 m/s
  - B 300 m/s
  - C 1500 m/s
  - D 5000 m/s
- 7 Space is a vacuum. Waves from stars are used to reveal information about the stars.
- Which type of waves do **not** reveal information about stars?
- A infra-red
  - B radio waves
  - C ultrasound
  - D  $\gamma$ -rays
- 8 A student stands 180 m in front of a vertical, flat cliff and bangs together two pieces of wood to make a short, loud sound.
- A timer records the echo of the sound 1.5 seconds after the pieces of wood are banged together.
- Based on this result, what is the speed of sound?
- A 120 m/s
  - B 240 m/s
  - C 270 m/s
  - D 540 m/s

- 9 A student finds that it takes sound 0.33 seconds to travel 100 metres.

From this information, what is the speed of sound?

- A** 30 m/s      **B** 60 m/s      **C** 300 m/s      **D** 600 m/s

- 10 The speed of sound in air is 330 m/s.

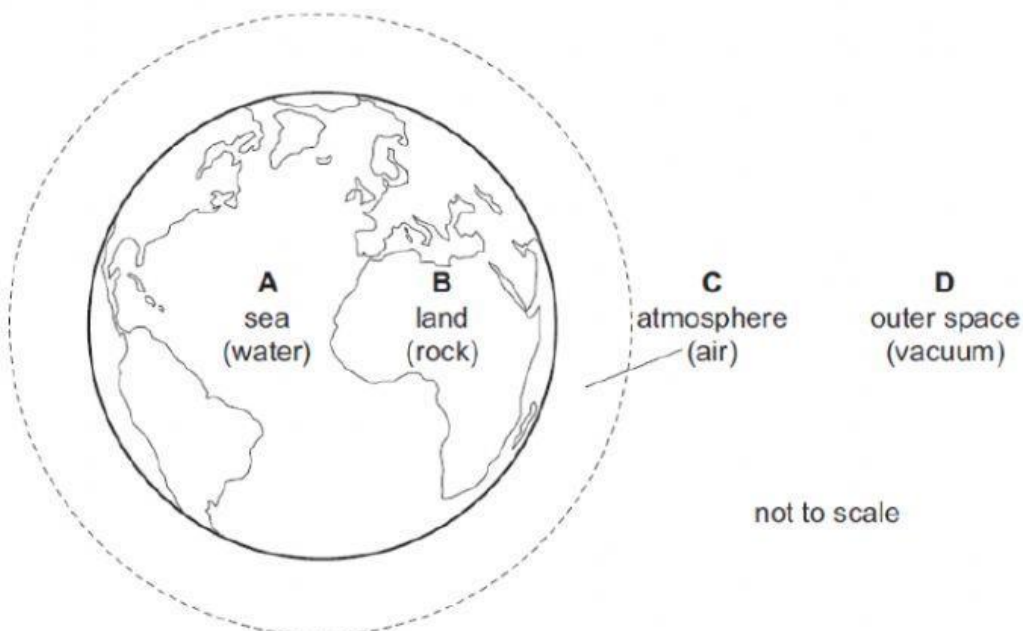
The speed of ultraviolet waves in air is 300 000 000 m/s.

Which row gives a possible frequency and speed of an ultrasound wave in air?

|          | frequency / Hz | <u>speed</u><br>m/s |
|----------|----------------|---------------------|
| <b>A</b> | 4000           | 330                 |
| <b>B</b> | 4000           | 300 000 000         |
| <b>C</b> | 40 000         | 330                 |
| <b>D</b> | 40 000         | 300 000 000         |

- 11 The diagram shows the Earth and its surroundings.

Through which labelled region can sound **not** be transmitted?



- 12 The diagrams show four sources of waves.

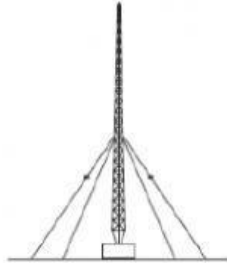
Which source produces longitudinal waves?

**A**



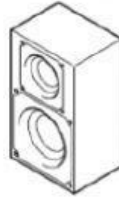
stick pushed up  
and down in water

**B**



radio  
transmitter

**C**



loudspeaker

**D**



lamp

- 13 A fire alarm is not loud enough and the pitch is too low. An engineer adjusts the alarm so that it produces a louder note of a higher pitch.

What effect does this have on the amplitude and on the frequency of the sound?

|          | amplitude | frequency |
|----------|-----------|-----------|
| <b>A</b> | larger    | greater   |
| <b>B</b> | larger    | smaller   |
| <b>C</b> | smaller   | greater   |
| <b>D</b> | smaller   | smaller   |

- 14

Which wavefront is travelling at a speed closest to that of a sound wave through a solid?

- A** one that moves 10 m in 0.01 s
- B** one that moves 50 m in 0.5 s
- C** one that moves 1000 m in 100 s
- D** one that moves 2000 m in 2000 s

- 15 Different waves travel through air.

Which waves have the greatest difference in speed?

- A ultrasound waves and sound waves
  - B ultrasound waves and ultraviolet waves
  - C ultraviolet waves and light waves
  - D ultraviolet waves and radio waves
- 16 A student stands 180 m in front of a vertical, flat cliff and bangs together two pieces of wood to make a short, loud sound.

A timer records the echo of the sound 1.5 seconds after the pieces of wood are banged together.

Based on this result, what is the speed of sound?

- A 120 m/s      B 240 m/s      C 270 m/s      D 540 m/s

The speed of sound is different in different states of matter.

The speed of sound in water is 1500 m/s.

- 17 Which row correctly compares the speed of sound in ice and the speed of sound in steam with the speed of sound in water?

|   | <u>speed of sound in ice</u><br>m/s | <u>speed of sound in steam</u><br>m/s |
|---|-------------------------------------|---------------------------------------|
| A | less than 1500                      | less than 1500                        |
| B | less than 1500                      | more than 1500                        |
| C | more than 1500                      | less than 1500                        |
| D | more than 1500                      | more than 1500                        |

- 18 A student finds that it takes sound 0.33 seconds to travel 100 metres.

From this information, what is the speed of sound?

- A 30 m/s      B 60 m/s      C 300 m/s      D 600 m/s

- 19 A sound wave travels from a medium in one state into the same medium but in another state. This causes the speed of the wave to change from approximately 300 m/s to approximately 3000 m/s.

Between which two states is the sound wave travelling?

- A gas to solid
  - B liquid to gas
  - C liquid to solid
  - D solid to liquid
- 20 A student stands a few hundred metres away from a wall and shouts. He hears a faint echo.
- Which statement is correct?
- A The sound waves returning are quiet because they have a reduced frequency.
  - B The sound waves returning are quiet because they have a reduced wavelength.
  - C The sound waves returning to the student are longitudinal.
  - D The sound waves returning to the student are transverse.
- 21 Which statement about ultrasound is correct?
- A It is produced by a rapidly vibrating source.
  - B It is uncomfortable to human ears.
  - C Its frequency must be greater than 300 kHz.
  - D It travels the fastest in a vacuum.
- 22 Which statement about sound waves is correct?
- A They are able to travel through a vacuum.
  - B They are able to travel through solids.
  - C They are transverse waves.
  - D They travel at the same speed in all substances.

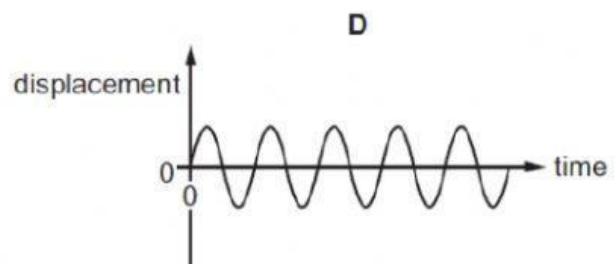
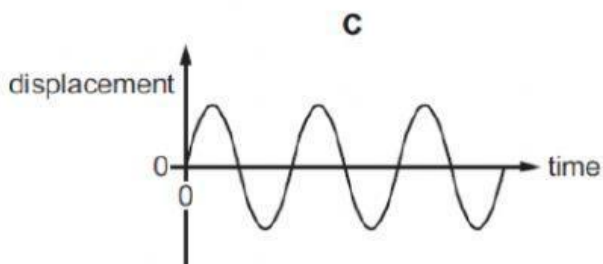
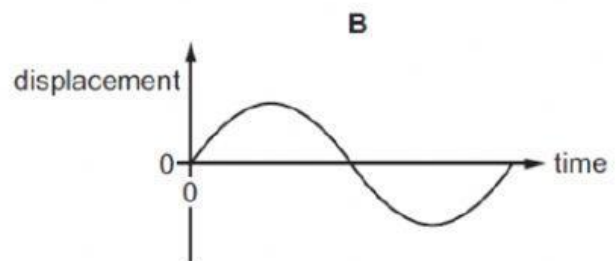
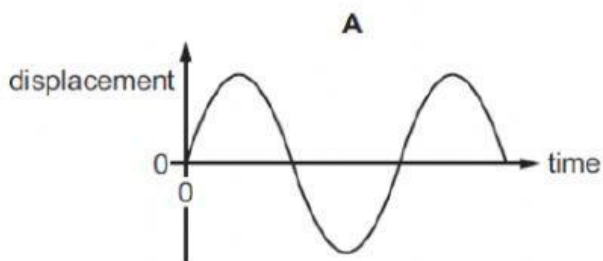
- 23 A girl notices that, when she shouts into a cave, she hears an echo.

Which wave property causes the echo?

- A** diffraction
- B** dispersion
- C** reflection
- D** refraction

- 24 The diagrams represent the displacement in four different sound waves. All the diagrams are drawn to the same scale.

Which diagram represents the sound with the highest pitch?



- 25 Which property of a sound wave affects the loudness of the sound?

- A** amplitude
- B** frequency
- C** speed
- D** wavelength

- 26 A man stands 110 m from a high wall. He makes a short, sharp sound and then hears an echo from the wall.

The speed of sound in air is 330 m/s.

How long after making the sound does the man hear the echo?

- A** 0.33 s      **B** 0.67 s      **C** 1.5 s      **D** 3.0 s

- 27 A man is talking at the side of a house. He can be heard by a woman at the front of the house even though she cannot see him.



What is the explanation for this?

- A** Sound waves are longitudinal and light waves are transverse.  
**B** Sound waves are transverse and light waves are longitudinal.  
**C** The sound waves have a long wavelength and the light waves have short wavelength.  
**D** The sound waves have a short wavelength and the light waves have long wavelength.

28

A sound wave has a certain amplitude and a certain frequency.

A second sound wave is quieter and lower in pitch than the first sound wave.

The second wave has

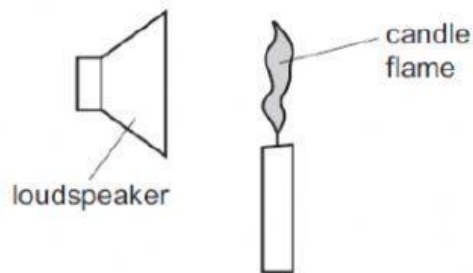
- A** a larger amplitude and a greater frequency.  
**B** a larger amplitude and a smaller frequency.  
**C** a smaller amplitude and a greater frequency.  
**D** a smaller amplitude and a smaller frequency.

29 What is the approximate range of hearing of a healthy human ear?

- A** 2.0 Hz to 2.0 kHz
- B** 2.0 Hz to 20 kHz
- C** 20 Hz to 2.0 kHz
- D** 20 Hz to 20 kHz

30 A candle flame is placed in front of a loudspeaker.

The loudspeaker produces a sound wave that causes air particles to vibrate. The vibrating air particles make the candle flame vibrate in the same direction as the air particles.



Which row shows the direction of vibration of the candle flame, and the nature of sound waves?

|          | direction of vibration                                                              | nature of sound waves |
|----------|-------------------------------------------------------------------------------------|-----------------------|
| <b>A</b> |  | longitudinal          |
| <b>B</b> |  | transverse            |
| <b>C</b> |  | longitudinal          |
| <b>D</b> |  | transverse            |

31 A sound wave travels through air as a series of compressions and rarefactions.

Which row correctly compares the air pressure in a compression and the air pressure in a rarefaction to the air pressure nearby where there is no sound wave?

|          | air pressure in a compression | air pressure in a rarefaction |
|----------|-------------------------------|-------------------------------|
| <b>A</b> | higher                        | higher                        |
| <b>B</b> | higher                        | lower                         |
| <b>C</b> | lower                         | higher                        |
| <b>D</b> | lower                         | lower                         |