

1. Nov/2020/Paper_11/No.30

Which description of a sound wave is correct?

- A** a longitudinal electromagnetic wave
- B** a transverse electromagnetic wave
- C** an oscillation of particles parallel to the direction of travel of the wave energy
- D** an oscillation of particles perpendicular to the direction of travel of the wave energy

2. Nov/2020/Paper_11/No.31

Where does sound travel the fastest?

- A** in a vacuum
- B** in gases
- C** in liquids
- D** in solids

3. Nov/2020/Paper_12/No.27

A scientific research boat uses pulses of ultrasound to detect fish underneath it.

A pulse of ultrasound is bounced from a group of fish 6000 m directly below the boat.

The next pulse is sent out 2.0 s after the echo from the previous pulse has been received.

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

What is the interval between the two pulses?

- A** 4.0 s **B** 6.0 s **C** 8.0 s **D** 10 s

4. Nov/2020/Paper_12/No.28

Which row correctly describes ultrasound?

	type of wave	frequency
A	longitudinal	less than 20 kHz
B	longitudinal	greater than 20 kHz
C	transverse	less than 20 kHz
D	transverse	greater than 20 kHz

5. June/2020/Paper_11/No.30

What is the ratio of the longest sound wavelength audible to a healthy human ear to the shortest?

- A** 20:1 **B** 1000:1 **C** 10 000:1 **D** 20 000:1

6. June/2020/Paper_11/No.31

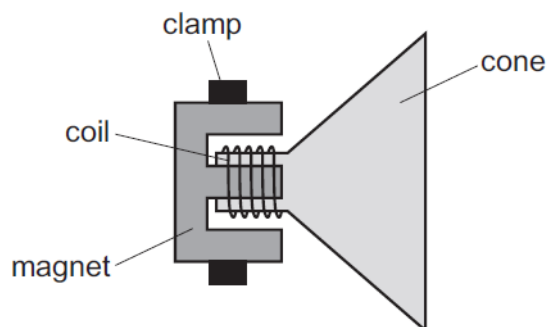
Ultrasound is used to clean jewellery in a liquid.

What is another use of ultrasound?

- A** optical fibre communication
B pre-natal scanning
C sunbeds
D telephone communications

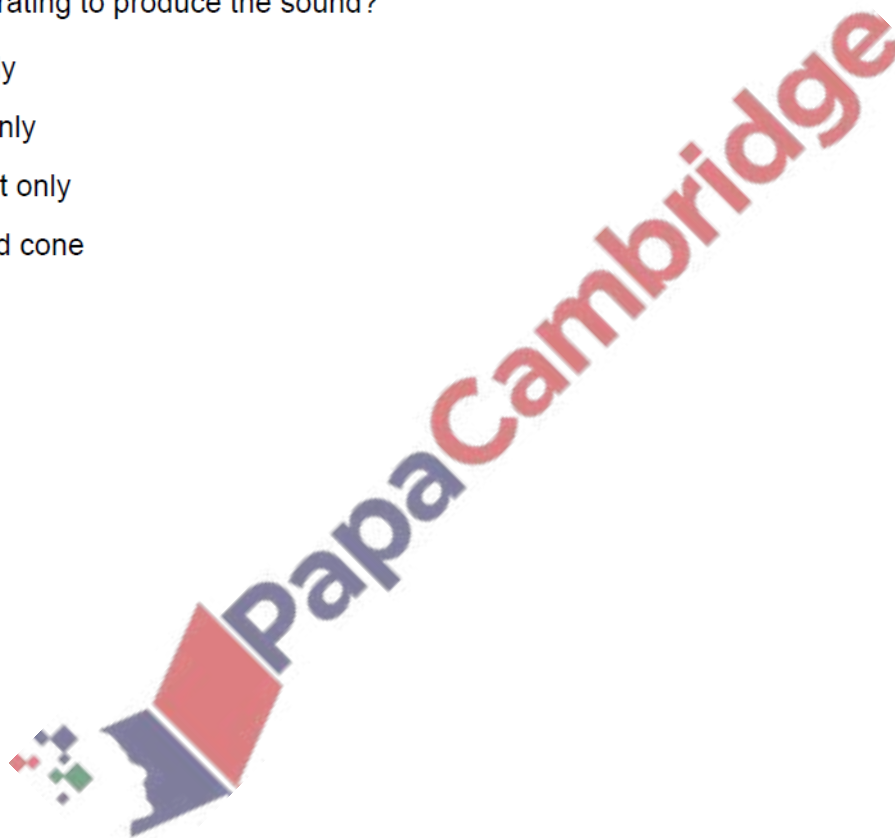
7. June/2020/Paper_11/No.33

There is varying current in the coil of the loudspeaker shown. The loudspeaker is producing a sound. The magnet is clamped.



What is vibrating to produce the sound?

- A coil only
- B cone only
- C magnet only
- D coil and cone



Ultrasound and X-rays are both used in medical imaging.

(a) (i) Define what is meant by *ultrasound*.

.....
 [2]

(ii) Describe what happens to ultrasound waves as they meet the boundary between two different materials.

.....
 [2]

(iii) To produce the image of an unborn child, an ultrasound emitter and receiver are placed close together on the mother's skin.

Fig. 9.1 shows pulses detected by the receiver.

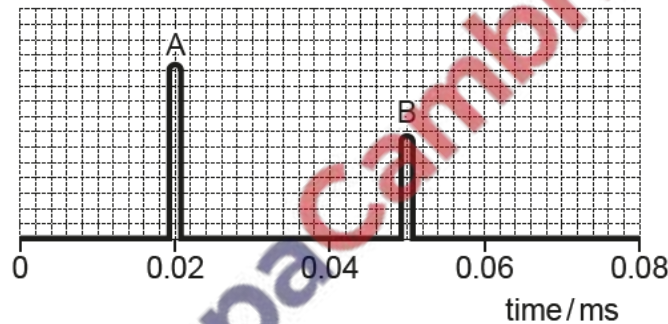


Fig. 9.1

Pulse A is the emitted pulse and pulse B is the first pulse that returns from the unborn child.

The average speed of ultrasound in human tissue is 1500 m/s.

Calculate the distance between the emitter and the child.

distance = [3]

(iv) The speed of ultrasound in human tissue is close to the speed of sound in water.

Suggest approximate values for the speed of sound in gases and solids.

speed in gases

speed in solids

[2]

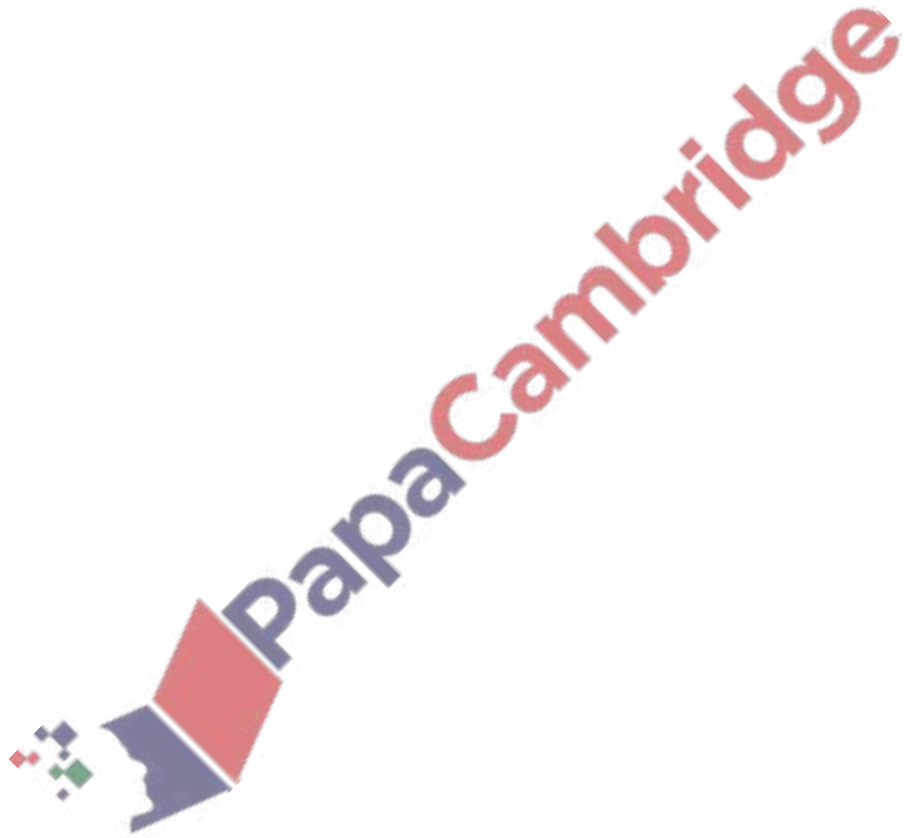


Fig. 10.1 is the trace on the screen of the oscilloscope.

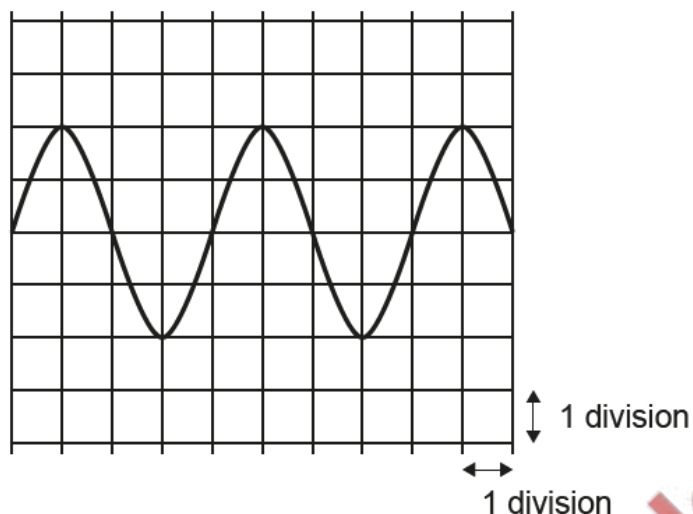


Fig. 10.1

(c) The trace shown in Fig. 10.1 is caused by a sound.

The sound travels through the air to a microphone from the place that it is made. The microphone is connected to the oscilloscope which displays the waveform shown.

(i) Sound is a type of wave.

State which type.

..... [1]

(ii) Describe the motion of the air molecules as the sound passes through the air to the microphone.

.....

 [2]

(iii) Describe and explain how the trace on the screen changes as the pitch of the sound becomes higher. The settings on the oscilloscope are unchanged.

.....

 [2]