1)

Which of the following is a longitudinal wave?

A a light wave travelling through air

B a radio wave from a broadcasting station

C a ripple on the surface of water

D a sound wave travelling through air

2)

Which of the following is true for all transverse waves?

A They are all electromagnetic.

B They can all be polarised.

C They can all travel through a vacuum.

D They all involve the oscillation of atoms.

3)

What do **not** travel at the speed of light in a vacuum?

A electrons

B microwaves

C radio waves

D X-rays

4)

A sound wave of frequency 150 Hz travels in water at a speed of 1500 m s^{-1}. It then travels through the surface of the water and into air, where its speed is 300 m s^{-1}.

Which line in the table gives the correct values for the wavelengths of the sound in water and in air?

	wavelength in water / m	wavelength in air / m
A	0.10	0.10
B	0.10	0.50
C	10	2.0
D	10	50

5)

The number of wavelengths of visible light in one metre is of the order of

A 10^4. **B** 10^6. **C** 10^8. **D** 10^{10}.

6)

In which situation does diffraction occur?

A A wave bounces back from a surface.

B A wave passes from one medium into another.

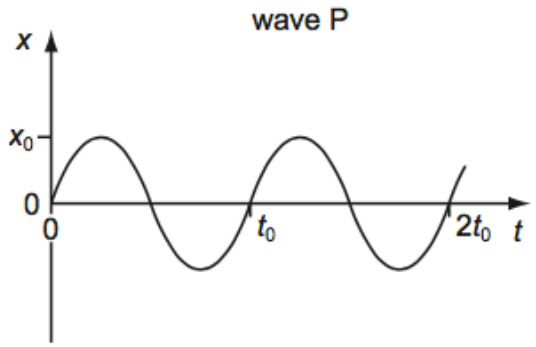
C A wave passes through an aperture.

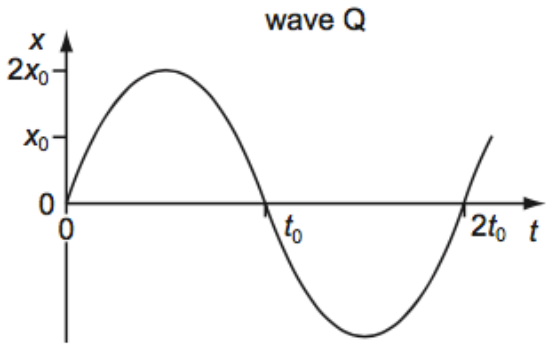
D Waves from two identical sources are superposed.

7)

The intensity of a progressive wave is proportional to the square of the amplitude of the wave. It is also proportional to the square of the frequency.

The variation with time t of displacement x of particles in a medium, when two progressive waves P and Q pass separately through the medium, are shown on the graphs.





The intensity of wave P is I_0.

What is the intensity of wave Q?

A $\frac{1}{2}I_0$ **B** I_0 **C** $8I_0$ **D** $16I_0$

8)

A health inspector is measuring the intensity of a sound. Near a loudspeaker his meter records an intensity I. This corresponds to an amplitude A of the sound wave. At another position the meter gives an intensity reading of $2I$.

What is the corresponding sound wave amplitude?

A $\frac{A}{\sqrt{2}}$ **B** $\sqrt{2}A$ **C** $2A$ **D** $4A$

9)

A wave of amplitude 20 mm has intensity I_X. Another wave of the same frequency but of amplitude 5 mm has intensity I_Y.

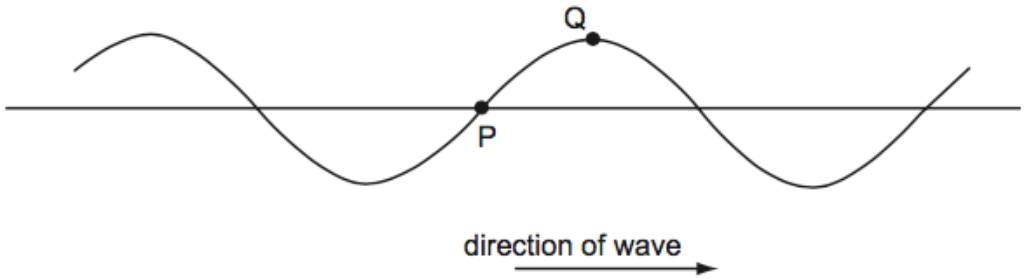
What is $\frac{I_X}{I_Y}$?

A 2 **B** 4 **C** 16 **D** 256

10)

The diagram shows a transverse wave on a rope. The wave is travelling from left to right.

At the instant shown, the points P and Q on the rope have zero displacement and maximum displacement respectively.



Which of the following describes the direction of motion, if any, of the points P and Q at this instant?

	point P	point Q
A	downwards	stationary
B	stationary	downwards
C	stationary	upwards
D	upwards	stationary

11)

Which observation indicates that sound waves are longitudinal?

A Sound can be reflected from a solid surface.

B Sound cannot be polarised.

C Sound is diffracted around corners.

D Sound is refracted as it passes from hot air to cold air.

12)

Which statement correctly relates the intensity of a sound wave to the vibrations of the molecules?

A intensity α amplitude

B intensity α (amplitude)^2

C intensity α displacement

D intensity α (displacement)^2

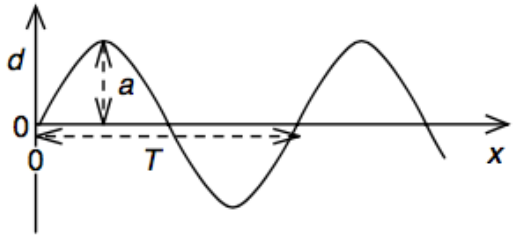
13)

The four graphs represent a progressive wave on a stretched string. Graphs **A** and **B** show how the displacement *d* varies with distance *x* along the string at one instant. Graphs **C** and **D** show how the displacement *d* varies with time *t* at a particular value of *x*.

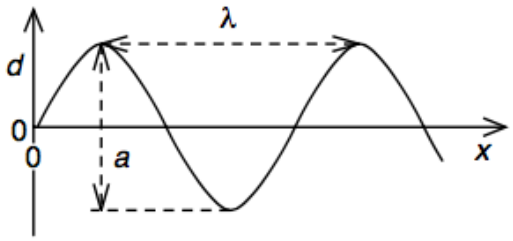
The labels on the graphs are intended to show the wavelength λ, the period *T*, and the amplitude *a* of the wave, but only one graph is correctly labelled.

Which graph is correctly labelled?

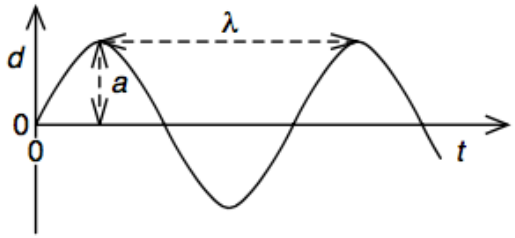
A



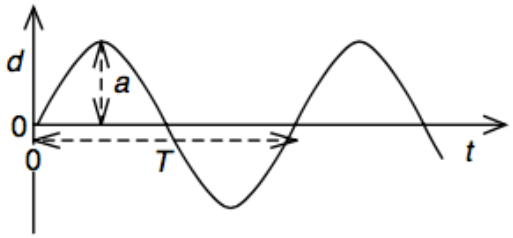
B



C



D



14)

A wave of amplitude *a* has an intensity of 3.0 Wm^{-2}.

What is the intensity of a wave of the same frequency that has an amplitude 2*a*?

A 4.2 Wm^{-2} **B** 6.0 Wm^{-2} **C** 9.0 Wm^{-2} **D** 12 Wm^{-2}