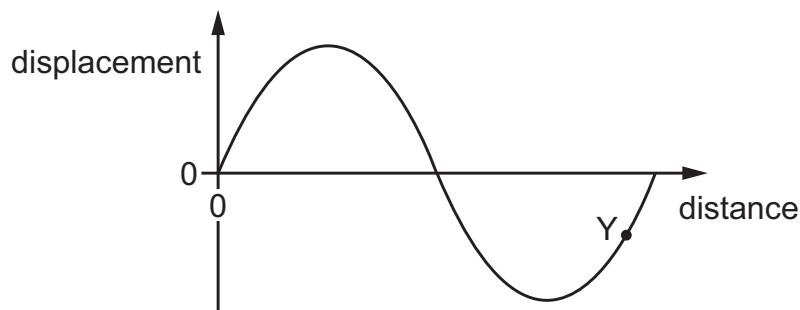


- 25** A source emits a progressive sound wave in the horizontal direction. The wave travels away from the source in a direction towards the right.

The graph shows the variation of the displacement of the particles from their equilibrium positions with distance from the source at a particular instant in time. Displacements to the right of the equilibrium positions are shown as positive.



Position Y represents the displacement of a particle in the sound wave at a particular distance from the source at this instant.

Which statement about the motion of this particle is correct?

- A** The particle is moving away from the source.
- B** The particle is moving towards the source.
- C** The particle is moving upwards.
- D** The particle is moving downwards.

- 24** Which row is correct for sound waves?

	can travel in a vacuum	can be polarised	can diffract through a gap
A	no	no	yes
B	yes	no	no
C	no	yes	no
D	no	yes	yes

- 26** Two polarising filters are placed next to each other so that their planes are parallel.

The first polarising filter has its transmission axis at an angle of 50° to the vertical.

The second polarising filter has its transmission axis at an angle of 20° to the vertical. The angle between the transmission axes of the two polarising filters is 30° .

A beam of vertically polarised light of intensity 8.0 W m^{-2} is incident normally on the first polarising filter.

What is the intensity of the light that is transmitted from the second polarising filter?

- A** zero **B** 2.5 W m^{-2} **C** 2.9 W m^{-2} **D** 6.0 W m^{-2}

- 27** A dolphin is swimming at a speed of 16.0 ms^{-1} directly towards a stationary underwater microphone.

The dolphin emits a sound of frequency 122 kHz . The speed of sound in water is 1480 ms^{-1} .

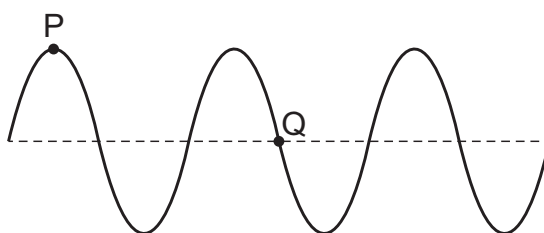
What is the frequency of sound detected by the microphone?

- A** 1300 Hz **B** 1330 Hz **C** 121 kHz **D** 123 kHz

- 24** Which row describes a progressive longitudinal wave?

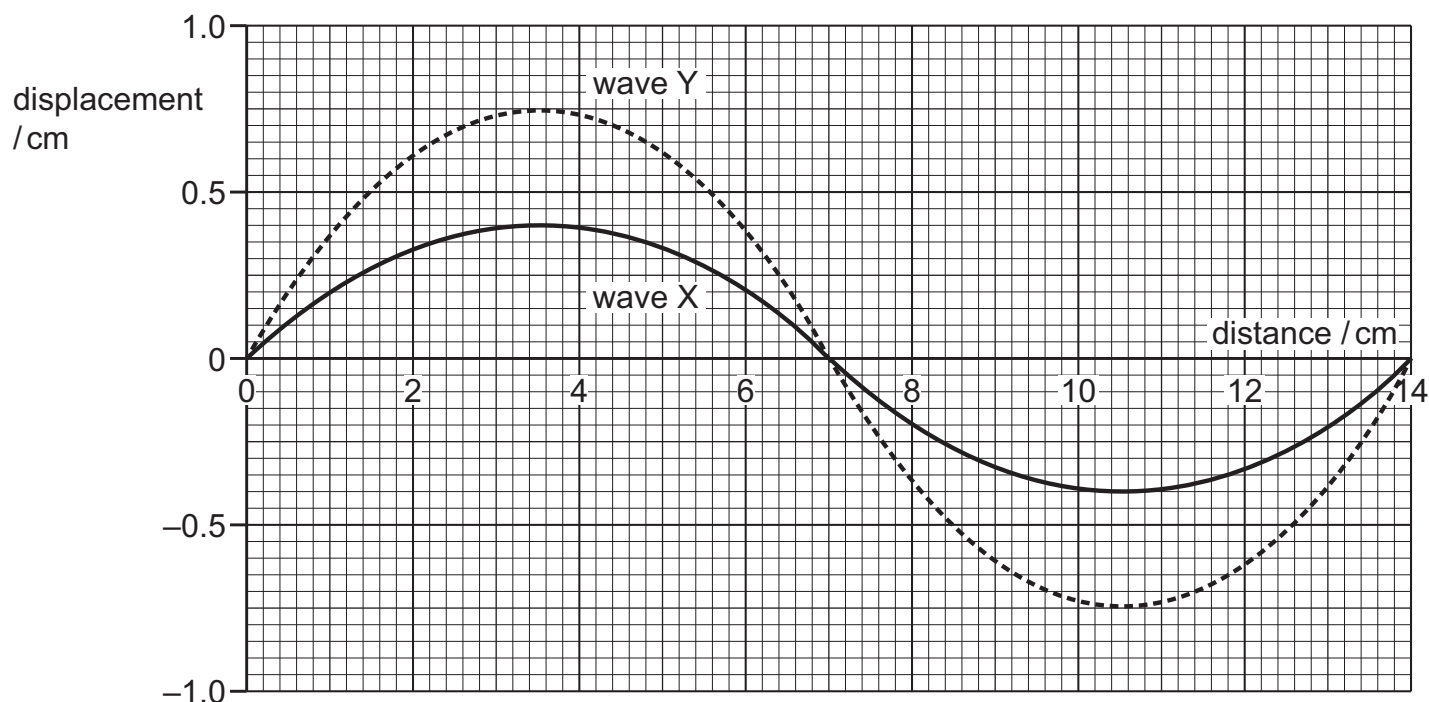
	transfers energy in a direction parallel to the oscillations	requires a medium to travel through	always travels at the same speed
A	false	false	true
B	false	true	true
C	true	false	false
D	true	true	false

- 25** What is the phase difference between points P and Q on the progressive wave shown in the diagram?



- A** 180° **B** 450° **C** 540° **D** 720°

- 26** The graph shows the variation of displacement with distance for two progressive waves X and Y of the same type in the same medium.



The intensity of wave X is I .

What is the intensity of wave Y?

- A** $0.28I$ **B** $0.53I$ **C** $1.9I$ **D** $3.5I$

- 27** A moving source emits sound of frequency 1200 Hz.

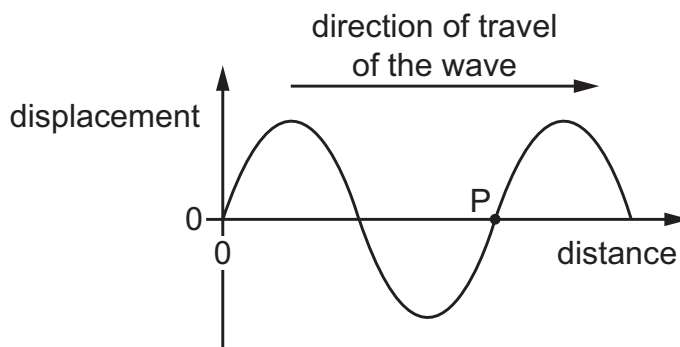
A stationary observer hears sound of frequency 960 Hz. The speed of the sound is 340 m s^{-1} .

What could be the velocity of the source?

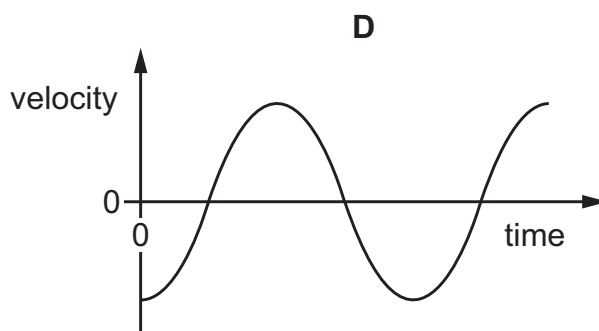
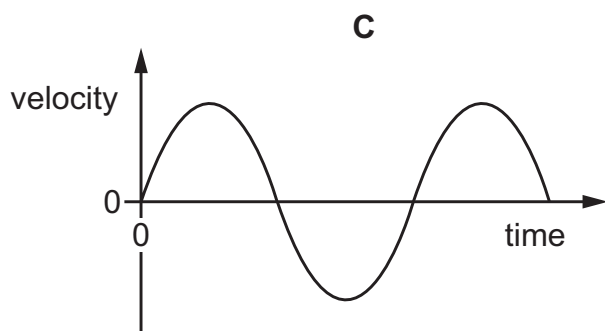
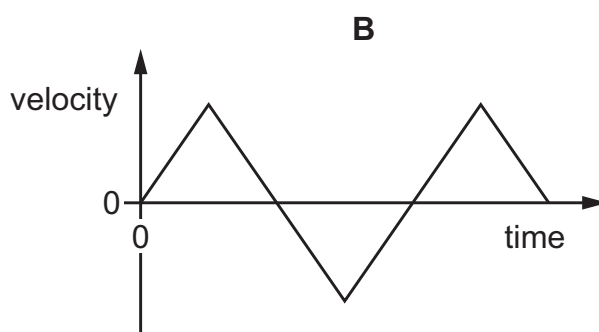
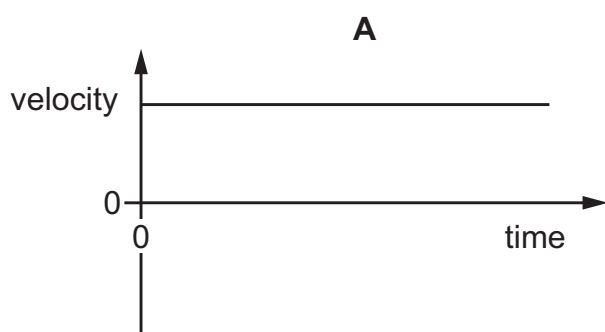
- A** 68 m s^{-1} directly away from the observer
B 68 m s^{-1} directly towards the observer
C 85 m s^{-1} directly away from the observer
D 85 m s^{-1} directly towards the observer

24 A transverse progressive wave travels along a string.

The graph shows the variation with distance of the displacement of the string at time $t = 0$.



Which graph represents the variation with time of the velocity of point P on the string?



27 An aircraft flies at a velocity v_s directly away from a stationary observer.

The aircraft emits a sound of constant frequency.

The speed of sound in air is v .

The frequency of the sound heard by the observer on the ground is 500 Hz.

The speed of the aircraft is increased so that it flies away from the observer at a greater velocity.

The observer now hears a sound of frequency 250 Hz.

Which expression gives the new velocity of the aircraft?

- A** $2(v + v_s)$ **B** $\frac{v + v_s}{2}$ **C** $2v_s + v$ **D** $2v_s - v$