

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

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

What is the frequency of sound detected by the microphone?

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

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

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** $2v_s - v$

24 An aircraft produces a sound at a frequency of 30.0 Hz .

The speed of sound in air is 330 m s^{-1} .

The aircraft is directly in front of the stationary observer and travels in a straight line towards or away from the observer.

The observer hears the sound from the aircraft at a frequency of 20.0 Hz .

What is the speed and direction of the aircraft?

	speed / m s^{-1}	direction
A	110	away from observer
B	110	towards observer
C	165	away from observer
D	165	towards observer

26 A buzzer emitting sound of frequency 846 Hz is attached to a string and rotated in a horizontal circle. The linear speed of the buzzer is 25.0 m s^{-1} .



The speed of sound is 340 m s^{-1} .

What is the maximum frequency heard by the observer?

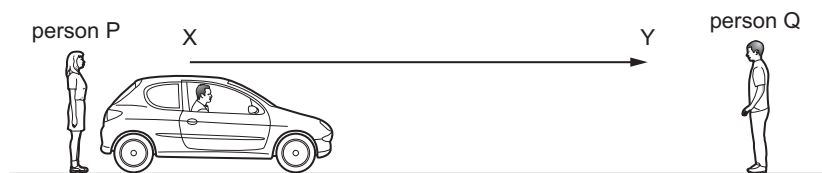
- A** 783 Hz **B** 788 Hz **C** 908 Hz **D** 913 Hz

22 A vehicle is moving with a speed of 30.0 m s^{-1} directly towards a stationary observer. The horn of the vehicle emits sound of frequency 440 Hz . The speed of sound in air is 340 m s^{-1} .

What is the frequency of the sound heard by the observer?

- A** 401 Hz **B** 404 Hz **C** 479 Hz **D** 483 Hz

- 24** The diagram shows a car travelling at a constant speed in a straight line between person P and person Q from point X to point Y.



The car sounds its horn continuously as it travels. The horn emits sound of constant frequency.

Which statements about what person P and person Q hear during the motion of the car are correct?

- 1 Person P hears a sound of increasing frequency.
- 2 Person Q hears a sound of decreasing frequency.
- 3 Person Q always hears a sound of higher frequency than person P.

- A** 1, 2 and 3
B 1 and 2 only
C 3 only
D none of them