20 With which types of wave can the Doppler shift be observed?

A all types of wave

B light and sound waves only

C sound waves and water waves only

D sound waves only

21 A distant star is receding from the Earth with a speed of $1.40 \times 10^7\,\text{m s}^{-1}$. It emits light of frequency $4.57 \times 10^{14}\,\text{Hz}$. The speed of light is $3.00 \times 10^8\,\text{m s}^{-1}$.

The Doppler effect formula can be used with light waves.

What will be the frequency of this light when detected on Earth?

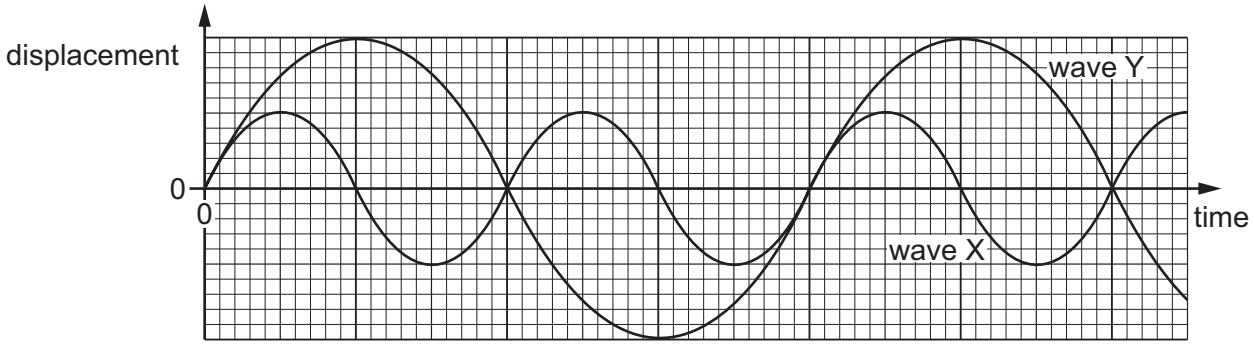
A $2.04 \times 10^{13}\,\text{Hz}$

B $4.37 \times 10^{14}\,\text{Hz}$

C $4.57 \times 10^{14}\,\text{Hz}$

D $4.79 \times 10^{14}\,\text{Hz}$

22 The graph shows the variation with time of the displacement of two separate waves X and Y.



Wave X has frequency *f* and amplitude *A*.

What is the frequency and what is the amplitude of wave Y?

	frequency	amplitude
A	$\frac{1}{2}f$	$\frac{1}{2}A$
B	$\frac{1}{2}f$	$2A$
C	$2f$	$\frac{1}{2}A$
D	$2f$	$2A$