22 A source of sound waves is moving at a constant speed directly towards a stationary observer.

The sound waves have a speed of $340\,m\,s^{-1}$ and a frequency of 480 Hz. The observer hears sound waves of frequency 650 Hz.

What is the speed of the source?

A $89\,m\,s^{-1}$ **B** $120\,m\,s^{-1}$ **C** $250\,m\,s^{-1}$ **D** $340\,m\,s^{-1}$

23 A student is investigating two electromagnetic waves, X and Y, in a vacuum.

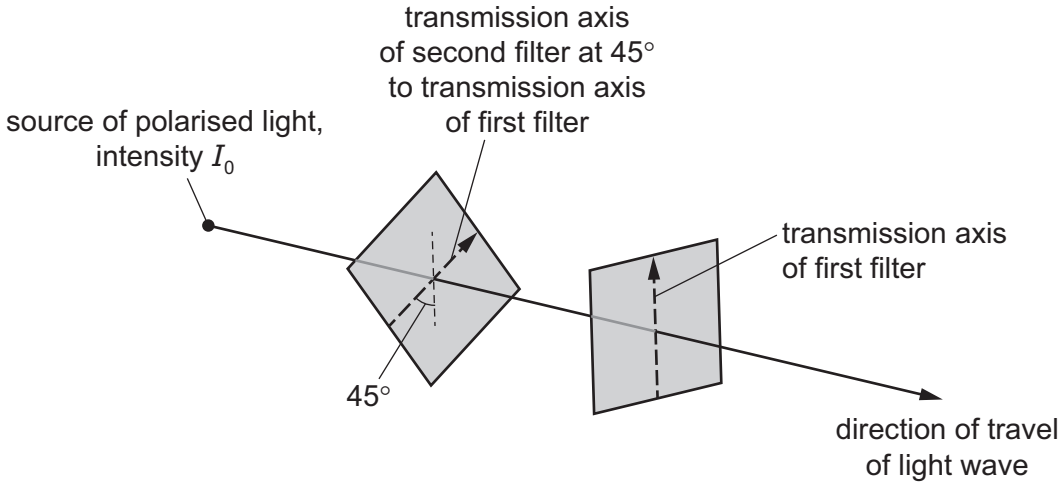
Wave X has a wavelength of 5.2×10^{-7} m. Wave Y has a frequency of 9.4 GHz.

Which principal regions of the electromagnetic spectrum contain waves X and Y?

	X	Y
A	radio wave	ultraviolet
B	ultraviolet	visible
C	visible	microwave
D	microwave	radio wave

24 A plane polarised light wave of intensity I_0 is incident normally on a polarising filter. The initial intensity of the transmitted wave is 0.

A second polarising filter is then inserted between the source and the first filter. Its transmission axis is at 45° to the transmission axis of the first filter, as shown.



What is the intensity of the transmitted wave from the filter combination?

A 0 **B** $\frac{I_0}{8}$ **C** $\frac{I_0}{4}$ **D** $\frac{I_0}{2}$