

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

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

What is the speed of the source?

- A**  $89 \text{ ms}^{-1}$       **B**  $120 \text{ ms}^{-1}$       **C**  $250 \text{ ms}^{-1}$       **D**  $340 \text{ ms}^{-1}$

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

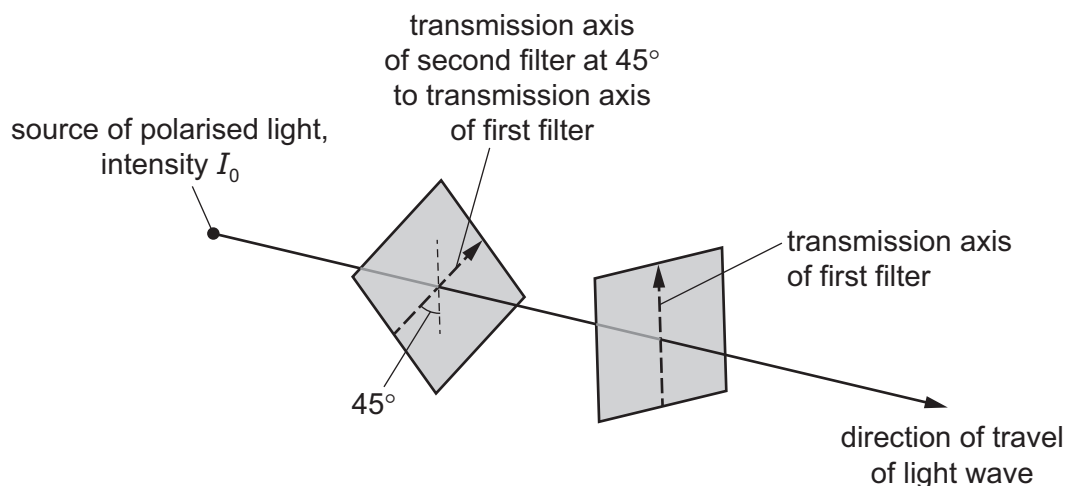
Wave X has a wavelength of  $5.2 \times 10^{-7} \text{ m}$ . Wave Y has a frequency of  $9.4 \text{ GHz}$ .

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

	X	Y
<b>A</b>	radio wave	ultraviolet
<b>B</b>	ultraviolet	visible
<b>C</b>	visible	microwave
<b>D</b>	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  $45^\circ$  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**  $\frac{I_0}{2}$