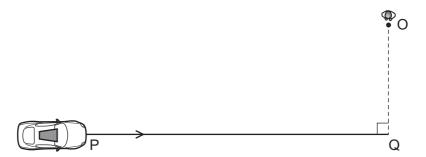
22 A car travels at a constant speed along a straight line PQ.

A loudspeaker attached to the car emits sound of constant frequency f. A stationary observer is at point O.



What does the observer hear as the car moves from P towards Q?

- A a frequency less than f that decreases as the car moves from P towards Q
- **B** a frequency less than *f* that increases as the car moves from P towards Q
- **C** a frequency more than *f* that decreases as the car moves from P towards Q
- **D** a frequency more than *f* that increases as the car moves from P towards Q

23 Some sources of electromagnetic waves in free space are listed.

- 1 a radio wave transmitter
- 2 a source of X-rays
- 3 a 30 mm wavelength radar transmitter
- 4 a light-emitting diode that emits red light

Which list gives the sources in order of increasing wavelength, from left to right, of the waves emitted by the sources?

- **A** $1 \rightarrow 3 \rightarrow 4 \rightarrow 2$
- **B** $2 \rightarrow 4 \rightarrow 1 \rightarrow 3$
- $\mathbf{C} \quad 2 \to 4 \to 3 \to 1$
- **D** $3 \rightarrow 1 \rightarrow 4 \rightarrow 2$