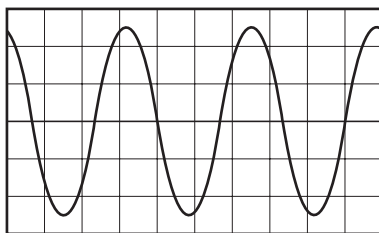


- 23** A sound wave is detected by a microphone that is connected to a cathode-ray oscilloscope (CRO).

The screen of the CRO displays a waveform, as shown.



The time-base is set to $20\ \mu\text{s div}^{-1}$.

What is the frequency of the sound wave?

- A** 15 Hz **B** 15 000 Hz **C** 20 000 Hz **D** 30 000 Hz
- 24** A person stands at the side of a straight railway track. A train moves towards the person and emits sound from its whistle. The person hears a sound of frequency 1690 Hz as the train approaches him.

The person then hears sound of frequency 1500 Hz as the train moves away from him. The speed of sound in air is $340\ \text{m s}^{-1}$.

What is the speed of the train?

- A** $20\ \text{m s}^{-1}$ **B** $38\ \text{m s}^{-1}$ **C** $41\ \text{m s}^{-1}$ **D** $43\ \text{m s}^{-1}$
- 25** Which list shows electromagnetic waves in order of decreasing frequency?
- A** gamma-rays → infrared → ultraviolet → radio waves
- B** gamma-rays → ultraviolet → infrared → radio waves
- C** radio waves → infrared → ultraviolet → gamma-rays
- D** radio waves → ultraviolet → infrared → gamma-rays