

Solutions

Each answer shows the steps, then the **result**.

2.1

- $v = f\lambda$

$$v = (50 \text{ Hz})(0.40 \text{ m}) = \mathbf{20 \text{ m/s}}$$

2.2

- in a transverse wave the particles vibrate at right angles to the travel direction; in a longitudinal wave they vibrate along it

3.1 C

- frequency is the number of waves per second

3.2

(a) $f = v/\lambda$

$$f = \frac{0.30 \text{ m/s}}{0.020 \text{ m}} = \mathbf{15 \text{ Hz}}$$

(b) the waves spread out (diffract)

- because the gap is about the same size as the wavelength

3.3

- $\lambda = v/f$

$$\lambda = \frac{3.0 \times 10^8 \text{ m/s}}{1.0 \times 10^8 \text{ Hz}} = \mathbf{3.0 \text{ m}}$$