

A wave is produced in a coil which travels a distance of 60 m in 12 seconds. An observer standing next to the coil counts a total of 15 crests passing him in 5 seconds.

Determine...

- a) the period
- b) the frequency
- c) the wave speed
- d) the wavelength

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a) the period

$$T = \frac{5 \text{ s}}{15 \text{ WAVELENGTHS}} = \frac{0.333 \text{ s}}{1 \text{ WAVELENGTH}} = \boxed{0.333 \text{ s}}$$

b) the frequency

$$f = \frac{15 \text{ WAVELENGTHS}}{5 \text{ s}} = \frac{3 \text{ WAVELENGTHS}}{1 \text{ s}} = \boxed{3 \text{ Hz}}$$

OR  $f = \frac{1}{T} = \frac{1}{0.333 \text{ s}} = \boxed{3 \text{ Hz}}$

c) the wave speed

$$v = \frac{d}{t} = \frac{60 \text{ m}}{12 \text{ s}} = \boxed{5 \frac{\text{m}}{\text{s}}}$$

d) the wavelength

$$v = \lambda f$$
$$\lambda = \frac{v}{f} = \frac{5}{3} = \boxed{1.67 \text{ m}}$$