Waves: Properties and the Wave Equation

Waves · 4 questions · step-by-step answers at the end

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USEFUL EQUATIONS

$v = f\lambda$ $T = 1 / f$

Questions

Show your working in the space under each question.

1. A sound wave travels at 340 m/s with frequency 170 Hz. Find its wavelength.

2. Water waves have a frequency of 4.0 Hz and a wavelength of 0.50 m. Find their speed and period.

3. A sonar pulse returns to a ship 0.40 s after it is sent. Sound travels at 1500 m/s in water. How deep is the sea?

4. Water waves pass from deep to shallow water. What happens to their speed, wavelength and frequency?

Step-by-step answers

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1. $\lambda = v/f = 340/170 =$ **2.0 m**.

2. 1. $v = f\lambda = 4.0 \times 0.50 =$ **2.0 m/s**.
2. $T = 1/f = 1/4.0 =$ **0.25 s**.
Answer: 2.0 m/s; 0.25 s

3. Distance there and back = 600 m, so the depth is **300 m**.

4. Speed and wavelength **decrease**; frequency is **unchanged**.