

The properties of waves - assignment.

[Total 48 marks]

(1) Calculate the frequency and time period of:

- (a) a slinky spring that undergoes 30 vibrations in 10 seconds [3]
(b) a pendulum that completes 250 full swings in one minute and 40 seconds. [3]

(2) In a ripple tank the trough of a water wave travels 70 cm in 2.5 seconds. [3]
Calculate the speed of the wave in metres per second.

(3) A musician strikes a tuning fork and it vibrates 250 times every second. The speed of sound in air is 340 m/s.

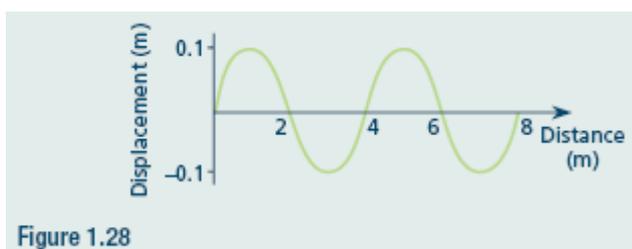
- (a) What is the period of the tuning fork? [3]
(b) What is the wavelength of the sound produced? [3]

(4) A water wave travels at a speed of 0.6 m/s across a pond and has a wavelength of 1.2m

- (a) How many times per second will a duck on the pond surface bob up and down? [3]
(b) Is the wave a longitudinal or transverse wave? Explain your answer using a suitable diagram [3]

(5) A 512Hz tuning fork held on a solid table surface produces waves with a wavelength of 8m. [3]
Calculate the speed of sound in the table.

(6) The displacement–distance graph below is for a continuous periodic wave.



- (a) What is the wavelength of the wave? Show this in the diagram and label it λ . [2]
(b) What is the amplitude of the wave? Show this on the diagram and label it A. [2]

(7) What happens to the wavelengths of waves in a ripple tank if the frequency of the wave source is doubled? [2]
Explain your answer.

(8) What happens to the speed of waves in a ripple tank if the frequency of the wave source is doubled? [2]
Think carefully and then explain your answer.

(9) A submarine's sonar equipment sends out a signal with a frequency of 33 kHz.

- (a) If the wave travels at 1320 m/s in water what is the wavelength of the wave produced? [3]
(b) If a similar signal travels through air at 330 m/s how does its wavelength compare to that in water? [3]

(10) Radio waves form part of the Electromagnetic (or EM) spectrum and travel at approximately 3×10^8 m/s in air.

- (a) If a local radio transmits its radio waves at a frequency of 774 kHz what is their wavelength? [3]
(b) If an FM radio station transmits radio waves with a wavelength of 295 cm what is its frequency? [3]

(11) Waves are moving along a beach with a speed of 3.3 m/s. The distance between their crests is 6.6 m. [4]
How many waves strike the shore in a day?