KEY

Waves Practice

1.) The period of a tuning fork is $0.136\ s$. What is its frequency?

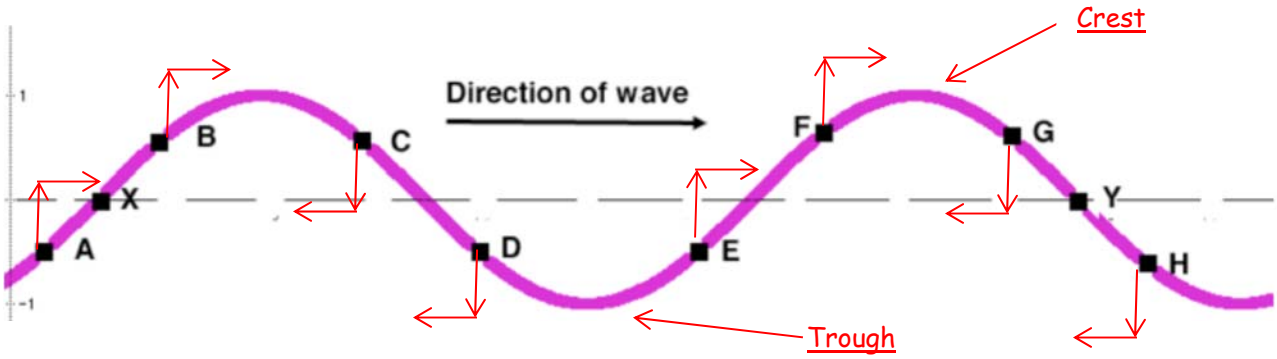
Answer - $f = \frac{1}{T}$ $f = \frac{1}{0.136}$ $f = 7.35\ Hz$

2a.) If a pendulum oscillates thirty-two times in two minutes, what is its frequency?

Answer - $\frac{32}{2} = 16\ per\ minute$ $\frac{16}{60} = 0.267\ Hz$ $f = 0.267\ Hz$

b.) what is the period? Answer - $T = \frac{1}{f}$ $f = \frac{1}{0.267}$ $T = 3.75\ s$

3.) The figure below shows a water wave.



a.) With arrows, show the direction of motion of a marker placed at each letter.

b.) Which pair of points are in phase?

c.) Measure the wavelength in centimetres. Answer – A and E or B and F etc.

d.) Label a crest and a trough.

4.) A vibrating paddle in a ripple tank, vibrates with a frequency of $3\ Hz$ and an amplitude of $2.5\ cm$. The resulting waves travel away from the source with the speed of $5.7\ \frac{m}{s}$, passing under various markers for the water.

a.) At what frequency do the markers oscillate?

Answer - *same as paddle.* $f = 3\ Hz$

b.) If the frequency of this source is changed to $4.5\ Hz$, what will happen to the speed of the waves and the frequency of the markers oscillation?

Answer - *same as paddle.* $f = 4.5\ Hz$ *speed is unchanged as media didn't change.*

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5.) The wave created by a stone dropped into a pool of water decreases in amplitude as they radiate out from the source. Why?

Answer - *energy in the wave is slowly converted into heat from friction between the medium particles. Less energy means less amplitude.*

6.) A pond is $12\ m$ across. The crest of two successive waves are $60.0\ cm$ apart and they move across the pond in $15\ s$.

a.) What is the velocity of the waves?

Answer - $\vec{v} = \frac{\Delta \vec{d}}{t}$ $\vec{v} = \frac{12}{15}$ $\vec{v} = +0.80\ \frac{m}{s}$

b.) What is the frequency of the waves?

Answer - $\vec{v} = \lambda f$ $0.80 = (0.60)f$ $f = 1.3\ Hz$

c.) What is the period of the waves?

Answer - $f = \frac{1}{T}$ $1.3333 = \frac{1}{0.136}$ $T = 0.77\ s$

7.) A swing has a frequency of $0.20\ Hz$. Its amplitude is of $1.2\ m$. What is the total distance travelled in one minute?

Answer - *0.2 Hz means 0.2 pulses per second. Therefore there is 1 pulse in 5 seconds, and ultimately 12 swings in 1 minute.*

– each swing is 2.4 m in total distance so 28.8 m is the total distance.

8.) The period of some ocean waves is $2.7\ s$.

a.) How many wave crests will hit the boat in $2.5\ min$.

Answer - $\frac{150}{2.7} = 55.5\ hits$

b.) If these waves travel at a speed of $1.3\ \frac{m}{s}$, what is their wavelength?

Answer - $\vec{v} = \frac{\lambda}{T}$ $1.3 = \frac{\lambda}{2.7}$ $\lambda = 3.51\ m$

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c.) If the waves slowdown to $0.90\frac{m}{s}$ near the shore,

i.) What is their wavelength? Answer - $\vec{v} = \frac{\lambda}{T}$ $0.90 = \frac{\lambda}{2.7}$ $\lambda = 2.43\ m$

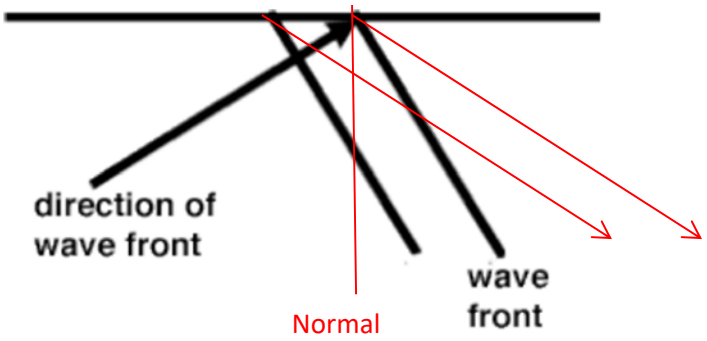
ii.) By how much has their frequency changed?

Answer - $f = \frac{1}{T}$ $f = \frac{1}{2.7}$ $f = 0.37\ s$

iii.) How many wave crests will hit the shore in $2.5\ min$?

Answer - $\vec{v} = \lambda f$ $\vec{v} = (2.43)(0.37)$ $\vec{v} = 0.90\frac{m}{s}$

9.) The figure below shows straight incident waves approaching a barrier.



a.) With a protractor, measure the angle of incidence and record? Answer - 58°

b.) Draw in the reflected waves, showing that each reflected wav joins up with the corresponding incident wave at the barrier, and record the angle of reflection.

Answer - 58°