

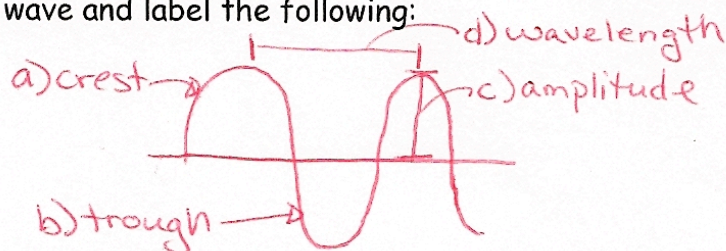
Name: Answer Key

## Physics 20 Waves Quiz

1. Define a wave: A wave is a periodic energy disturbance moving from one point to another

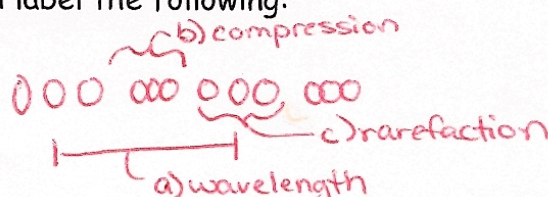
2. Draw a transverse wave and label the following:

- a. Crest
- b. Trough
- c. Amplitude
- d. Wavelength



3. Draw a longitudinal wave and label the following:

- a. Wavelength
- b. Compression
- c. Rarefaction



4. A wave has an amplitude of 2 cm and a frequency of 12 Hz, and the distance from a crest to the nearest trough is measured to be 5 cm. Determine the period of such a wave.

period (T) = ?      frequency (f) = 12 Hz

$$T = \frac{1}{f} = \frac{1}{12 \text{ Hz}} = \boxed{0.083 \text{ s}}$$

5. A tennis coach paces back and forth along the sideline 10 times in 2 minutes. The frequency of her pacing is \_\_\_\_\_.

$$\text{frequency} = \frac{\text{cycles}}{\text{second}} = \frac{10 \text{ cycles}}{120 \text{ s}} = 0.08\overline{3} \text{ Hz}$$

round to  $\boxed{0.08 \text{ Hz}}$

$$2 \text{ min} \times \frac{60 \text{ s}}{1 \text{ min}} = 120 \text{ s}$$

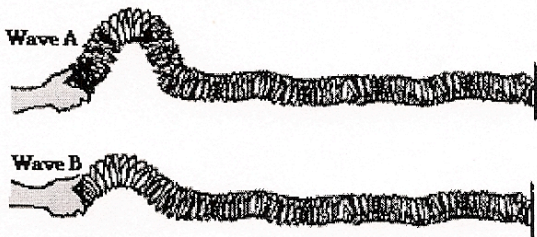
6. A child in a swing makes one complete back and forth motion in 4.0 seconds. This statement provides information about the child's....

- a) speed
- b) frequency
- c) period

7. As the frequency of a wave increases, the period of the wave decreases.



8. A teacher attaches a slinky to the wall and begins introducing pulses with different amplitude. Which of the two pulses (A or B) below will reach the wall first? Explain your answer.



Neither. They will both reach the wall at the same time - speed is only affected by the medium.

9. A vibrating source with a frequency of 20.0 Hz produces water waves that have a wavelength of 3.0 cm. Calculate the speed of the waves.

$$f = 20.0 \text{ Hz} \quad \lambda = 3.0 \text{ cm} \times \frac{1 \text{ m}}{100 \text{ cm}} = 0.030 \text{ m}$$

$$v = f\lambda = (20.0 \text{ Hz})(0.030 \text{ m}) = \boxed{0.60 \text{ m/s}}$$

10. A wave travels at 10.0 m/s. If the wavelength is .10m, what are the frequency and period of the wave?

$$v = 10.0 \text{ m/s} \quad \lambda = 0.10 \text{ m}$$

$$v = f\lambda \rightarrow f = v/\lambda$$

$$f = \frac{10.0 \text{ m/s}}{0.10 \text{ m}}$$

$$f = 100 \text{ Hz}$$

$$T = \frac{1}{f} = \frac{1}{100 \text{ Hz}} = \boxed{0.010 \text{ s}}$$

11. It takes a water wave 5.2 seconds to travel between two docks that are 19 m apart. An observer notices that 20. crests pass the first dock in 17 seconds. Find the wavelength of the water waves.

$$v = \frac{\text{distance}}{\text{time}} = \frac{19 \text{ m}}{5.2 \text{ s}} = 3.7 \text{ m/s}$$

$$f = \frac{\text{cycles}}{\text{second}} = \frac{20}{17 \text{ s}} = 1.2 \text{ Hz}$$

$$v = f\lambda \rightarrow \lambda = v/f$$

$$\lambda = \frac{3.7 \text{ m/s}}{1.2 \text{ Hz}}$$

$$\boxed{\lambda = 3.1 \text{ m}}$$



12. A pulse is sent on a spring towards a fixed end. The pulse will be reflected:  
(circle the best answer)
- a. right side up
  - ☒ b. upside down
  - c. faster
  - d. not at all

*Inverted!*

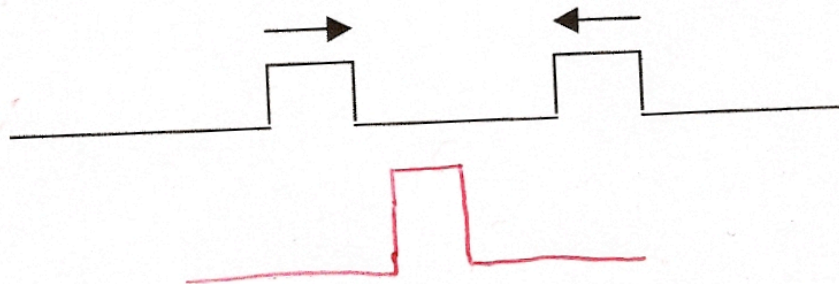
13. A pulse is sent along a thick piece of rope attached to a thin piece of rope. When the pulse goes into the thin rope the transmitted pulse: (circle the best answer)
- a. is upside down
  - ☒ b. is right side up
  - c. has a different frequency
  - d. none of the above



*free end.*

Using the Principle of Superposition, draw the resultant wave displacement below each diagram.

14.



15.

