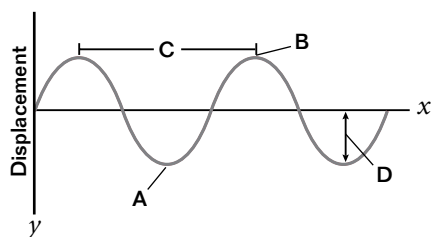


9. If the pendulum completes exactly 12 cycles in 2.0 min, what is the frequency of the pendulum?
- A. 0.10 Hz C. 6.0 Hz
B. 0.17 Hz D. 10 Hz
10. If the pendulum's length is 2.00 m and $a_g = 9.80 \text{ m/s}^2$, how many complete oscillations does the pendulum make in 5.00 min?
- F. 1.76 H. 106
G. 21.6 J. 239

Base your answers to questions 11–13 on the graph below.



11. What kind of wave does this graph represent?
- A. transverse wave
B. longitudinal wave
C. electromagnetic wave
D. pulse wave
12. Which letter on the graph is used for the wavelength?
- F. A H. C
G. B J. D
13. Which letter on the graph is used for a trough?
- A. A C. C
B. B D. D

Base your answers to questions 14–15 on the passage below.

A wave with an amplitude of 0.75 m has the same wavelength as a second wave with an amplitude of 0.53 m. The two waves interfere.

14. What is the amplitude of the resultant wave if the interference is constructive?
- F. 0.22 m H. 0.75 m
G. 0.53 m J. 1.28 m

15. What is the amplitude of the resultant wave if the interference is destructive?
- A. 0.22 m C. 0.75 m
B. 0.53 m D. 1.28 m
16. Two successive crests of a transverse wave are 1.20 m apart. Eight crests pass a given point every 12.0 s. What is the wave speed?
- F. 0.667 m/s H. 1.80 m/s
G. 0.800 m/s J. 9.60 m/s

SHORT RESPONSE

17. Green light has a wavelength of $5.20 \times 10^{-7} \text{ m}$ and a speed in air of $3.00 \times 10^8 \text{ m/s}$. Calculate the frequency and the period of the light.
18. What kind of wave does not need a medium through which to travel?
19. List three wavelengths that could form standing waves on a 2.0 m string that is fixed at both ends.

EXTENDED RESPONSE

20. A visitor to a lighthouse wishes to find out the height of the tower. The visitor ties a spool of thread to a small rock to make a simple pendulum. Then, the visitor hangs the pendulum down a spiral staircase in the center of the tower. The period of oscillation is 9.49 s. What is the height of the tower? Show all of your work.
21. A harmonic wave is traveling along a rope. The oscillator that generates the wave completes 40.0 vibrations in 30.0 s. A given crest of the wave travels 425 cm along the rope in a period of 10.0 s. What is the wavelength? Show all of your work.

Test TIP Take a little time to look over a test before you start. Look for questions that may be easy for you to answer, and answer those first. Then, move on to the harder questions.