1. In a wave, the distance traveled by a wave during one period is called:
   (A) Amplitude  (B) Frequency  (C) Wavelength  (D) Displacement  (E) Intensity

2. A stretched wire resonates in one loop. The midpoint of the wire oscillates with an amplitude of A. What is the traveled distance of the midpoint in one period?
   (A) A  (B) 2A  (C) 3A  (D) 4A  (E) 5A

3. A distance between two consecutive crests is called the wave's:
   (A) Period  (B) Frequency  (C) Amplitude  (D) Wavelength  (E) Speed

4. The frequency of a wave is doubled when the speed stays the same. Which of the following is true about the wavelength?
   (A) Doubles  (B) Quadruples  (C) Halved  (D) Decreased to one-fourth  (E) Stays the same

5. A wave travels with a speed of v on a string of length L and mass M. The string is stretched to a tension force T. If the tension in the string is doubled, what is the new speed of the wave?
   \[ v \]
   (A) 2v  (B) v  (C) \( \sqrt{2} \) v  (D) v/2  (E) \( \sqrt{2} v \)

6. A wave travels with a speed of v on a string of length L and mass M. The string is stretched to a tension force T. If the linear density is quadrupled, what is the new speed of the wave?
   \[ v \]
   (A) 2v  (B) v  (C) \( \sqrt{2} \) v  (D) v/2  (E) \( \sqrt{2} v \)
7. A wave pulse travels to the right along a thin string. The string is connected to a thick rope. Which of the following is true about the direction of the reflected and transmitted pulses?

(A) They are both upright

(B) They are both inverted

(C) The reflected is upright and transmitted is inverted

(D) The reflected is inverted and transmitted is upright

(E) The pulse disappears between the string and the rope

8. Two pulses of equal positive amplitude travel toward each other on a string. Which of the following is true about an oscillating point where the pulses pass through each other?

(A)

(B)

(C)

(D)

(E)
9. Two pulses of equal and opposite amplitude travel toward each other on a string. Which of the following is true about an oscillating point where the pulses pass through each other?

(B) 

(C) 

(D) 

(E) 

10. A string of length $L$ oscillates at a frequency at which a standing wave is produced. What is the wavelength of the wave in the string?

(A) $L$  
(B) $L/2$  
(C) $L/3$  
(D) $2L/3$  
(E) $2L/5$
11. A string of length L oscillates at a frequency at which a standing wave is produced. What is the wavelength of the wave in the string?

(A) L  (B) L/2  (C) L/3  (D) 2L/3  (E) 2L/5

12. A string of length L oscillates at a frequency at which a standing wave is produced. What is the wavelength of the wave in the string?

(A) L  (B) L/2  (C) L/3  (D) 2L/3  (E) 2L/5

13. A “snapshot” of a wave is given on the graph. What is the amplitude of oscillations?

(A) 0.5 m  (B) 1 m  (C) 1.5 m  (D) 2 m  (E) 2.5 m
14. A “snapshot” of a wave is given on the graph. What is the wavelength?

(A) 0.5 m  (B) 1 m  (C) 1.5 m  (D) 2 m  (E) 2.5 m

15. A “snapshot” of a wave is given on the graph. What is the speed of the wave if the frequency of oscillation is 16 Hz?

(A) 4 m/s  (B) 8 m/s  (C) 16 m/s  (D) 24 m/s  (E) 36 m/s
16. A string with a length of 3 m oscillates at a frequency 6 Hz. What is the speed of the wave in the string?
   (A) 3 m/s  (B) 6 m/s  (C) 9 m/s  (D) 12 m/s  (E) 15 m/s

17. A string with a length of 3 m oscillates at a frequency 6 Hz. What is the fundamental frequency?
   (A) 1 Hz  (B) 2 Hz  (C) 3 Hz  (D) 4 Hz  (E) 6 Hz

18. The wave interference on a surface of water is presented by the diagram. Which of the following would represent the regions of maximum amplitude of the resultant oscillations?
   I from M to L  II from M to P  III from M to K
   (A) only I
   (B) only II
   (C) only III
   (D) only I and II
   (E) only I and III
1. A string that is a length of 2.5 m resonates in five loops as shown above. The string linear density is 0.05 kg/m and the suspended mass is 0.5 kg.

   a. What is the wavelength?
   
   b. What is the wave speed?
   
   c. What is the frequency of oscillations?
   
   d. What will happen to the number of loops if the suspended mass is increased?
2. A string with a length of 1.5 m resonates in three loops as shown above. The string linear density is 0.03 kg/m and the suspended mass is 1.2 kg.

   a. What is the wavelength?

   b. What is the wave speed?

   c. What is the frequency of oscillations?

   d. What will happen to the number of loops if the suspended mass is increased?
3. Two waves on the surface of water are generated by two independent sources vibrating at the same frequency 1 Hz. The waves travel at a speed of 2.4 m/s. A point P is located 3.8 m from source 1 and 5.0 m from source 2.

a. What is the wavelength of the waves?

b. What is the extra distance traveled by the second wave before it reaches point P?

c. What is the result of the interference at the point P?

d. What will be the result of interference at the point P if source 2 is moved 3.6 m further back?

e. What will be the result of interference at the point P if source 2 is moved 4.2 m further back?

4. Two waves on the surface of water are generated by two independent sources vibrating at the same frequency 4.0 Hz. The waves travel at a speed of 3.2 m/s. A point P is located 4.2 m from source 1 and 4.6 m from source 2.

a. What is the wavelength of the waves?

b. What is the extra distance traveled by the second wave before it reaches point P?

c. What is the result of the interference at the point P?

d. What will be the result of interference at the point P if source 2 is moved 1.2 m further back?

e. What will be the result of interference at the point P if source 2 is moved 1.6 m further back?
Answers

Multiple Choice

1. C
2. D
3. D
4. C
5. C
6. A
7. D
8. A
9. C
10. A
11. D
12. E
13. D
14. C
15. D
16. D
17. B
18. E

Free Response

1. a. 1 m
  b. 9.89 m/s
  c. 9.89 Hz
  d. The number of loops would decrease

2. a. 1 m
  b. 19.79 m/s
  c. 19.79 Hz
  d. The number of loops would decrease

3. a. 2.4 m
  b. 1.2 m
  c. Destructive
  d. Constructive
  e. Partially Destructive

4. a. 0.8 m
  b. 0.4 m
  c. Destruction
  d. Construction
  e. Partially Destructive