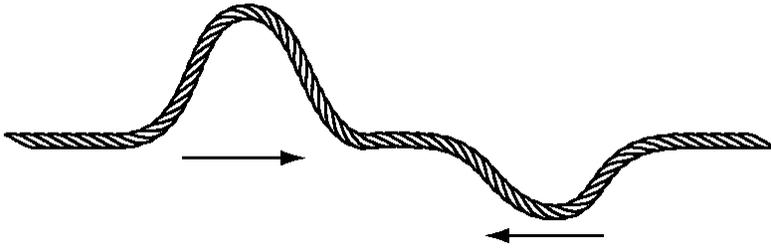


Phys.12-Q2W5-Test.-Vibrations and waves

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ___ 1. Waves arriving at a free boundary are
a. inverted but not reflected. c. reflected but not inverted.
b. neither reflected nor inverted. d. reflected and inverted.
- ___ 2. Which of the following types of interference will occur when the pulses in the figure above meet?
a. total interference c. no interference
b. constructive interference d. destructive interference
- ___ 3. Two mechanical waves can occupy the same space at the same time because waves
a. are displacements of matter. c. are matter.
b. do not cause interference patterns. d. cannot pass through one another.
- ___ 4. A 2.0 m long stretched rope is fixed at both ends. Which wavelength would *not* produce standing waves on this rope?
a. 4.0 m c. 6.0 m
b. 2.0 m d. 3.0 m
- ___ 5. In the diagram above, use the superposition principle to find the resultant wave of waves W and Z.
a. a c. d
b. c d. b
- ___ 6. One end of a taut rope is fixed to a post. What type of wave is produced if the free end is quickly raised and lowered one time?
a. sine wave c. periodic wave
b. longitudinal wave d. pulse wave
- ___ 7. Which of the following wavelengths would produce standing waves on a string approximately 3.5 m long?
a. 2.33 m c. 4.55 m
b. 2.85 m d. 3.75 m
- ___ 8. A child on a playground swings through a total of 32° . If the displacement is equal on each side of the equilibrium position, what is the amplitude of this vibration? (Disregard frictional forces acting on the swing.)
a. 8.0° c. 32°
b. 16° d. 64°
- ___ 9. Waves arriving at a fixed boundary are
a. inverted but not reflected. c. reflected and inverted.
b. reflected but not inverted. d. neither reflected nor inverted.
- ___ 10. Which of the following wavelengths would *not* produce standing waves on a rope whose length is 1 m?
a. 2 m c. $2\frac{1}{4}$ m
b. $\frac{2}{3}$ m d. 1 m



- ___ 11. Which of the following types of interference will occur when the pulses in the figure above meet?
- no interference
 - total interference
 - destructive interference
 - constructive interference
- ___ 12. How many nodes and antinodes are shown in the standing wave above?
- four nodes and four antinodes
 - five nodes and four antinodes
 - four nodes and three antinodes
 - four nodes and five antinodes
- ___ 13. A mass attached to a spring vibrates back and forth. At the equilibrium position, the
- net force reaches a maximum.
 - velocity reaches zero.
 - acceleration reaches a maximum.
 - velocity reaches a maximum.
- ___ 14. Tripling the displacement from equilibrium of an object in simple harmonic motion will change the magnitude of the object's maximum acceleration by what factor?
- one-third
 - 1
 - 3
 - 9
- ___ 15. By what factor should the length of a simple pendulum be changed in order to triple the period of vibration?
- 9
 - 6
 - 27
 - 3
- ___ 16. For a system in simple harmonic motion, which of the following is the number of cycles or vibrations per unit of time?
- frequency
 - amplitude
 - period
 - revolution
- ___ 17. Standing waves are produced by periodic waves of
- any amplitude and wavelength traveling in the same direction.
 - the same amplitude and wavelength traveling in the same direction.
 - any amplitude and wavelength traveling in opposite directions.
 - the same frequency, amplitude, and wavelength traveling in opposite directions.
- ___ 18. A simple pendulum swings in simple harmonic motion. At maximum displacement,
- the acceleration reaches a maximum.
 - the acceleration reaches zero.
 - the restoring force reaches zero.
 - the velocity reaches a maximum.
- ___ 19. In the diagram above, use the superposition principle to find the resultant wave of waves Q and R.
- b
 - c
 - d
 - a
- ___ 20. When a mechanical wave's amplitude is reduced by half, the energy the wave carries in a given time interval is
- decreased to one-half.
 - decreased to one-fourth.
 - doubled.
 - increased by a factor of 1.4.
- ___ 21. Which of the following most affects the wavelength of a mechanical wave moving through a medium? Assume that the frequency of the wave remains constant.
- the height of a crest
 - the energy carried by the wave
 - the amplitude
 - the nature of the medium

- _____ 22. The superposition of mechanical waves can be observed in the movement of
- a. bumper cars.
 - b. electromagnetic radiation.
 - c. violin bows in an orchestra.
 - d. water waves in a ripple tank.
- _____ 23. Which of the following is a single nonperiodic disturbance?
- a. sine wave
 - b. transverse wave
 - c. pulse wave
 - d. periodic wave
- _____ 24. Two mechanical waves that have positive displacements from the equilibrium position meet and coincide. What kind of interference occurs?
- a. complete destructive
 - b. constructive
 - c. destructive
 - d. none
- _____ 25. Which of the following types of interference will occur when the pulses in the figure above meet?
- a. no interference
 - b. complete constructive interference
 - c. complete destructive interference
 - d. partial interference

Problems

26. Waves propagate along a stretched string at a speed of 6.9 m/s. The end of the string vibrates up and down once every 3.6 s. What is the wavelength of the waves traveling along the string?
- A. 24 B. 25 C. 26 D. 27
27. A periodic wave has a wavelength of 0.58 m and a speed of 14 m/s. What is the wave frequency?
- A. 18 Hz B. 20 Hz C. 22 Hz D. 24 Hz
28. A student wishes to construct a mass-spring system that will oscillate with the same frequency as a swinging pendulum with a period of 3.99 s. The student has a spring with a spring constant of 77.1 N/m. What mass should the student use to construct the mass-spring system?
- A. 31.1 kg B. 30.1 C. 29.1 D. 28.1
29. A mass on a spring vibrates in simple harmonic motion at an amplitude of 8.0 cm. If the mass of the object is 0.65 kg and the spring constant is 120 N/m, what is the frequency?
- A. 2.1 Hz B. 3.1 Hz C. 4.1 Hz D. 5.1 Hz
30. Vibration of a certain frequency produces a standing wave on a stretched string that is 1.6 m long. The standing wave has 7 nodes and 5 antinodes. What is the wavelength of the wave that produces this standing wave?
- A. 0.54 m B. 0.64 m C. 0.74 m D. 0.84 m

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