Physics of Waves

Choose one answer per question. Circle A, B, C, or D.

1. Which word describes the lowest point of a transverse wave drawn above and below a horizontal resting line?

A. Trough
B. Crest
C. Compression
D. Medium

2. A pulse travels to the right on a rope while a marked section of rope moves up and down. What kind of wave motion is this?

A. Rotational
B. Longitudinal
C. Transverse
D. Static

3. In a sound wave traveling through still air, what moves parallel to the direction the wave travels?

A. Air particles move steadily with the wave to the listener
B. Air particles oscillate back and forth
C. Air particles oscillate only up and down
D. Air particles remain completely still

4. On a wave drawing, the crest is 3.5 cm above the resting line and the trough is 3.5 cm below it. What is the amplitude?

A. 0 cm
B. 7.0 cm
C. 1.75 cm
D. 3.5 cm

5. Which of these can travel from a spacecraft through the near-vacuum of space to a distant receiver?

A. A sound wave made by a bell
B. A radio wave
C. A seismic P wave
D. A wave on a steel string

6. A marker on a spring makes 18 complete oscillations in 6 seconds. What is the frequency?

A. 3 Hz
B. 24 Hz
C. 108 Hz
D. One-third Hz

7. The interval from one crest passing a buoy to the next crest passing it is 0.25 seconds. What is the wave’s frequency?

A. 25 Hz
B. 0.25 Hz
C. 2 Hz
D. 4 Hz

8. A periodic wave has frequency 8 Hz and wavelength 0.75 m. What is its speed?

A. 8.75 m/s
B. 0.094 m/s
C. 6 m/s
D. 10.7 m/s

9. A pulse travels down a stretched rope. After the pulse passes, a small marker tied to the rope returns to its starting position. What did the pulse carry along the rope?

A. Energy without carrying the marker along with it
B. The marker all the way to the far end
C. A new length of rope
D. The tied section of rope permanently upward

10. Two small pulses overlap on a linear rope. Their individual displacements at a point are 6 mm upward and 2 mm downward. What is the total displacement there?

A. 2 mm downward
B. 8 mm upward
C. 4 mm downward
D. 4 mm upward

11. On the same ideal string at unchanged tension, the source frequency is tripled. How does the wavelength change?

A. It stays the same
B. It becomes three times as long
C. It becomes one-third as long
D. It becomes nine times as long

12. Adjacent nodes in a standing wave on a string are 0.45 m apart. What is the wavelength of the component waves?

A. 0.225 m
B. 0.90 m
C. 0.45 m
D. 1.80 m

13. An observer tracks a point halfway between neighboring antinodes of a standing wave. What is true about that point?

A. It alternates between being a node and an antinode every cycle
B. It oscillates with the largest amplitude
C. It travels along the string at the wave speed
D. It is a node and remains at rest

14. Wave A has a wavelength of 3 m and period 0.5 s. Wave B has a wavelength of 5 m and period 1.25 s. How do their speeds compare?

A. Wave A is 2 m/s faster
B. Wave B is 2 m/s faster
C. Both travel at 6 m/s
D. Wave B is three times as fast

15. Two waves of equal frequency reach one point half a cycle apart, but their amplitudes at that point are 7 mm and 4 mm. What is the amplitude of their sum there?

A. 11 mm
B. 0 mm
C. 3 mm
D. 7 mm