Types
Ms. Jablonowski

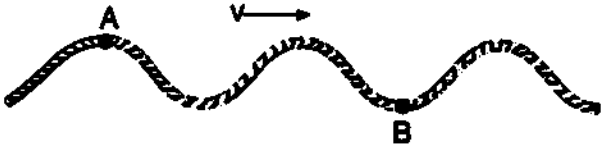
Waves #1

Name _____
Review

1 Two points on a transverse wave that have the same magnitude of displacement from equilibrium are in phase if the points also have the

1 same direction of displacement and the same direction of motion
2 same direction of displacement and the opposite direction of motion
3 opposite direction of displacement and the same direction of motion
4 opposite direction of displacement and the opposite direction of motion

2 A periodic wave travels through a rope, as shown in the diagram below.



As the wave travels, what is transferred between points *A* and *B*?

1 mass, only
2 energy, only
3 both mass and energy
4 neither mass nor energy

3 When an opera singer hits a high-pitch note, a glass on the opposite side of the opera hall shatters. Which statement best explains this phenomenon?

1 The frequency of the note and natural vibration frequency of the glass are equal.
2 The vibrations of the note are polarized by the shape of the opera hall.
3 The amplitude of the note increases before it reaches the glass.
4 The singer and glass are separated by an integral number of wavelengths.

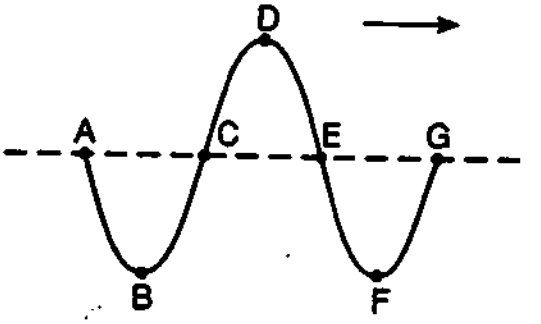
4 The amplitude of a sound wave is to its loudness as the amplitude of a light wave is to its

1 brightness
2 frequency
3 color
4 speed

5 What is the angle between the direction of propagation of a transverse wave and the direction in which the amplitude of the wave is measured?

(1) 0°
(2) 45°
(3) 90°
(4) 180°

6 The diagram below represents wave movement.



Which two points are in phase?

(1) *A* and *G*
(2) *B* and *F*
(3) *C* and *E*
(4) *D* and *F*

7 In the diagram below, the distance between points *A* and *B* on a wave is 0.10 meter.

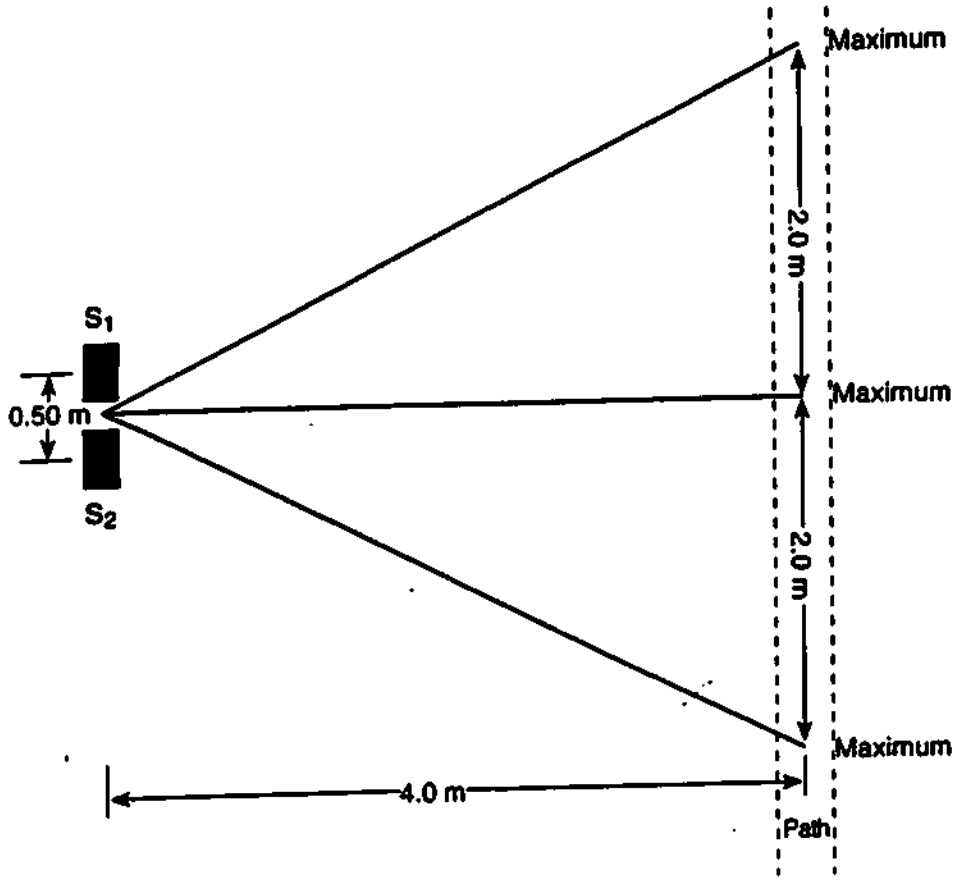
This wave must have

1 an amplitude of 0.10 m
2 an amplitude of 0.20 m
3 a wavelength of 0.10 m
4 a wavelength of 0.20 m

8 The driver of a car sounds the horn while traveling toward a stationary person. Compared to the sound of the horn heard by the driver, the sound heard by the stationary person has

1 lower pitch and shorter wavelength
2 lower pitch and longer wavelength
3 higher pitch and shorter wavelength
4 higher pitch and longer wavelength

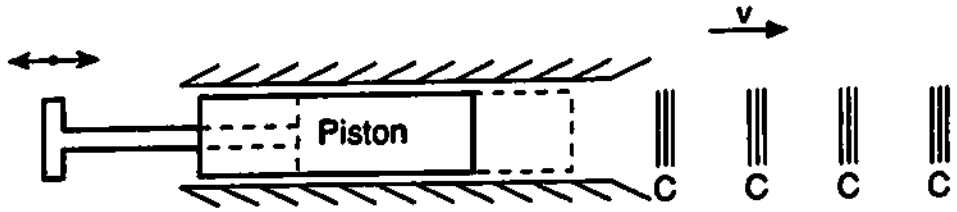
9 As shown in the diagram below, speakers S_1 and S_2, separated by a distance of 0.50 meter, are producing sound of the same constant frequency. A person walking along a path 4.0 meters in front of the speakers hears the sound reach a maximum intensity every 2.0 meters.



What is the wavelength of the sound produced by the speakers?

(1) 1.0 m
(2) 0.063 m
(3) 0.25 m
(4) 4.0 m

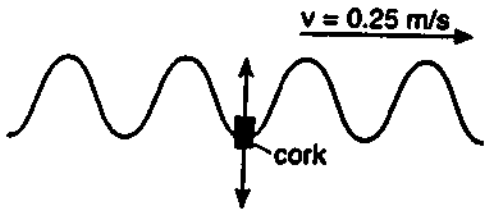
10 The diagram below shows a piston being moved back and forth to generate a wave. The piston produces a compression, C, every 0.50 second.



The frequency of this wave is

(1) 1.0 Hz
(2) 2.0 Hz
(3) 5.0×10^{-1} Hz
(4) 3.3×10^{2} Hz

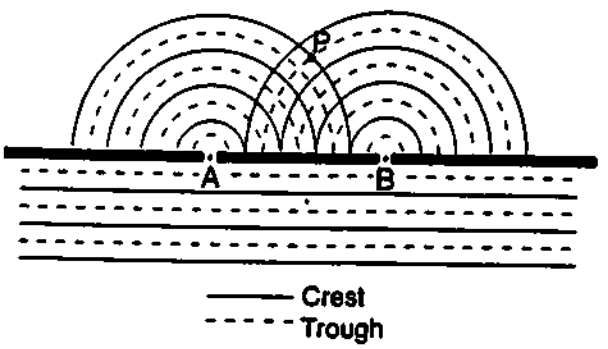
1 In the diagram below, a water wave having a speed of 0.25 meter per second causes a cork to move up and down 4.0 times in 8.0 seconds.



What is the wavelength of the water wave?

(1) 1.0 m
(2) 2.0 m
(3) 8.0 m
(4) 0.50 m

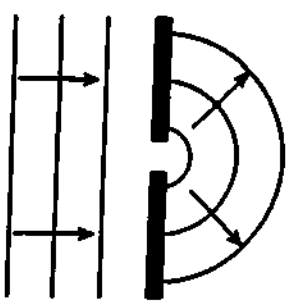
The diagram below represents shallow water waves of wavelength λ passing through two small openings, *A* and *B*, in a barrier.



Compared to the length of path *BP*, the length of path *AP* is

(1) 1λ longer
(2) 2λ longer
(3) $\frac{1}{2}\lambda$ longer
(4) the same

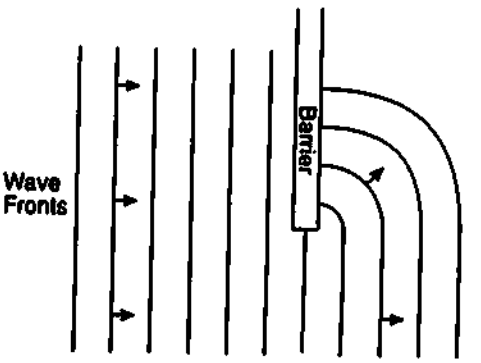
The diagram below shows straight wave fronts passing through an opening in a barrier.



This wave phenomenon is called

1 reflection
2 refraction
3 polarization
4 diffraction

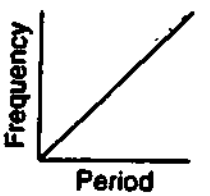
14 The diagram below shows a wave phenomenon.



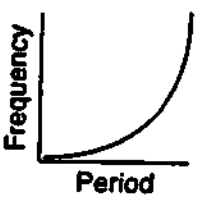
The pattern of waves shown behind the barrier is the result of

1 reflection
2 refraction
3 diffraction
4 interference

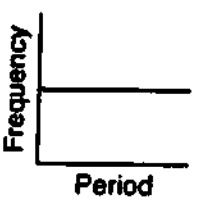
15 Which graph best represents the relationship between the frequency and period of a wave?



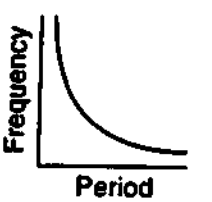
(1)



(3)

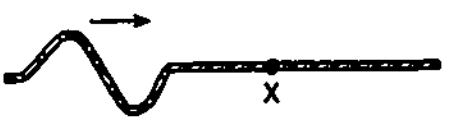


(2)



(4)

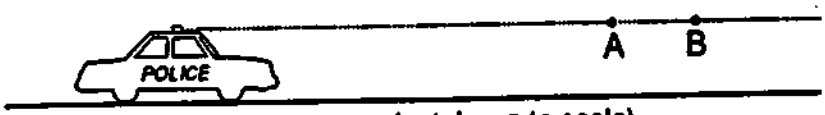
16 The diagram below shows a transverse wave moving to the right along a rope.



As the wave passes point *X*, the motion of *X* will be

1 up, then down
2 down, then up
3 left, then right
4 in a circle

Base your answers to questions 17 through 19 on the diagram below which shows a parked police car with a siren on top. The siren is producing a sound with a frequency of 680 hertz, which travels first through point *A* and then through point *B*, as shown. The speed of the sound is 340 meters per second.



(not drawn to scale)

17 If the sound waves are in phase at points *A* and *B*, the distance between the points could be

(1) 1λ

(2) $\frac{1}{2}\lambda$

(3) $\frac{3}{2}\lambda$

(4) $\frac{1}{4}\lambda$

18 What is the wavelength of the sound produced by the car's siren?

(1) 0.50 m

(2) 2.0 m

(3) 2.3×10^{5} m

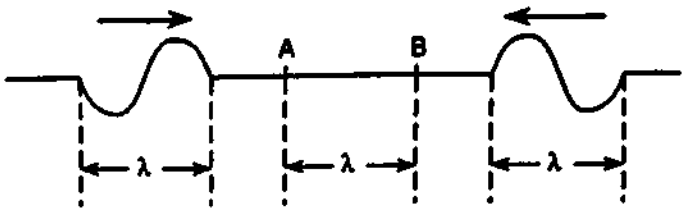
(4) 2.3×10^{-6} m

Note that question [illegible] has only three choices.

19 If the car were to accelerate toward point *A*, the frequency of the sound heard by an observer at point *A* would

1 decrease
2 increase
3 remain the same

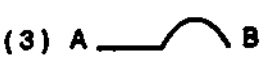
20 The diagram below shows two pulses, each of length λ, traveling toward each other at equal speed in a rope.

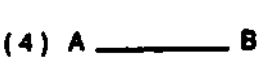


Which diagram best represents the shape of the rope when both pulses are in region *AB*?

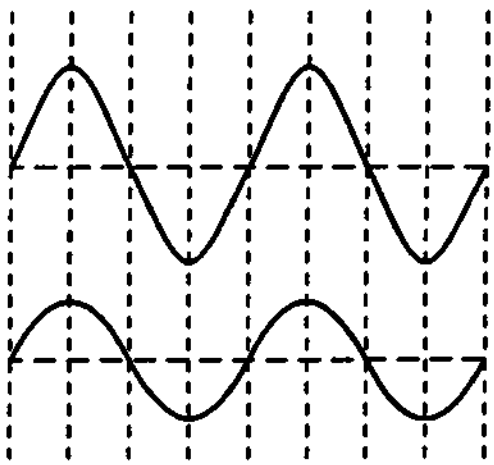
(1) 

(2) 

(3) 

(4) 

21 The diagram below shows two waves traveling in the same medium for the same length of time.



The two waves have different

1 amplitudes
2 frequencies
3 speeds
4 wavelengths

22 A stationary radar gun can determine the speed of a pitched baseball by measuring the difference in frequency between incident and reflected radar waves. This process illustrates

1 the Doppler effect
2 standing waves
3 the critical angle
4 diffraction

23 The diagram below represents a rope along which two pulses of equal amplitude, *A*, approach point *P*.

When the two pulses meet at *P*, the vertical displacement of the rope at point *P* will be

(1) *A*
(2) 2*A*
(3) 0
(4) $\frac{A}{2}$

24 A characteristic common to sound waves and light waves is that they

1 are longitudinal
2 are transverse
3 transfer energy
4 travel in a vacuum

25 As a longitudinal wave passes through a medium, the particles of the medium move

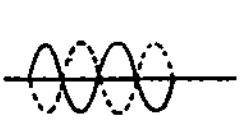
1 in circles
2 in ellipses
3 parallel to the direction of wave travel
4 perpendicular to the direction of wave travel

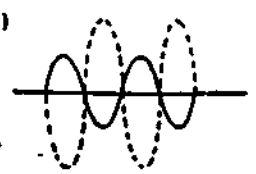
26 A wave traveling at 5.0×10^4 meters per second has a wavelength of 2.5×10^1 meters. What is the frequency of the wave?

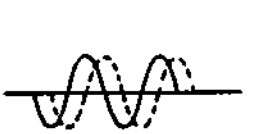
(1) 1.25×10^6 Hz
(2) 2.0×10^3 Hz
(3) 5.0×10^{-4} Hz
(4) 5.0×10^3 Hz

27 Which pair of waves will produce a resultant wave with the smallest amplitude?

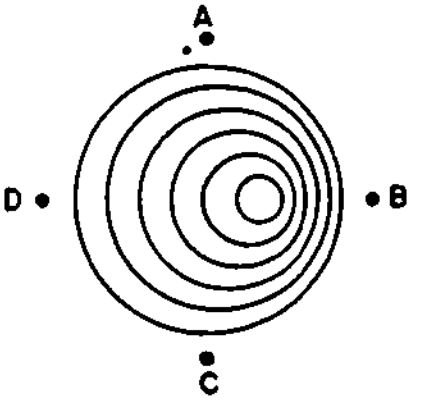
(1)


(3)


(2)


(4)


Base your answers to questions 28 through 31 on the diagram below which represents the wave pattern produced by a vibrating source moving linearly in a shallow tank of water. The pattern is viewed from above and the lines represent wave crests.



28 The source is moving toward point

(1) *A*
(2) *B*
(3) *C*
(4) *D*

29 The wave pattern is an illustration of

1 diffraction
2 interference
3 dispersion
4 the Doppler effect

Note that questions 30 and 31 have only three choices.

30 Compared to the frequency of the waves observed at point *D*, the frequency of the waves observed at point *B* is

1 lower
2 higher
3 the same

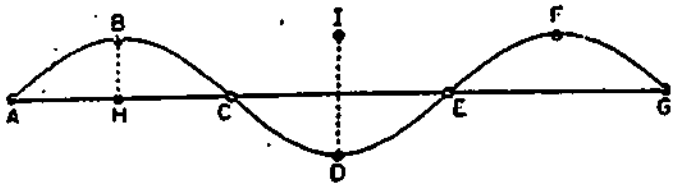
31 The velocity of the source is increased. The wavelength of the waves observed at point *D* will

1 decrease
2 increase
3 remain the same

32 As a wave is refracted, which characteristic of the wave will remain unchanged?

1 velocity
2 wavelength
3 frequency
4 direction

Base your answers to questions 33 through 36 on the diagram below which represents a transverse wave.



33 Which two points are in phase?
(1) *A* and *C* (2) *B* and *D* (3) *C* and *E* (4) *B* and *F*

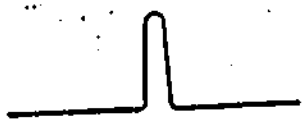
34 The amplitude of the wave is the distance between points
(1) *A* and *C* (2) *A* and *E* (3) *B* and *H* (4) *I* and *D*

35 How many cycles are shown in the diagram?
(1) 1 (2) 2 (3) 3 (4) 1.5

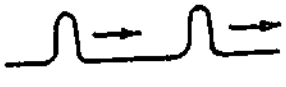
36 A wavelength is the distance between points
(1) *A* and *C* (2) *A* and *E* (3) *B* and *H* (4) *I* and *D*

37 If the period of the wave is 2 seconds, its frequency is
(1) 0.5 cycle/sec (3) 3.0 cycles/sec
(2) 2.5 cycles/sec (4) 1.5 cycles/sec

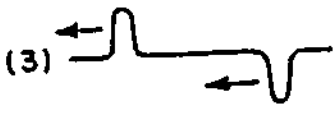
38 Which pair of pulses represented below, moving through the same medium, will produce the pulse shown at the right when they are superimposed?



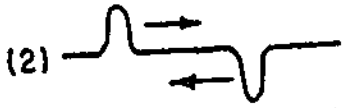
(1)



(3)



(2)



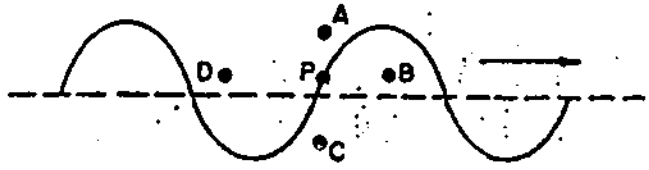
(4)

39 Maximum destructive interference between two waves occurs when the waves are out of phase by
(1) 45 degrees (3) 180 degrees
(2) 90 degrees (4) 360 degrees

40 As a wave enters a medium, there may be a change in the wave's
1 frequency 3 period
2 speed 4 phase

41 Standing waves are produced by two waves traveling in opposite directions in the same medium. These two waves must have
1 the same amplitude and the same frequency
2 the same amplitude and different frequencies
3 different amplitudes and the same frequency
4 different amplitudes and different frequencies

42 A wave is generated in a rope which is represented by the solid line in the diagram below. As the wave moves to the right, point *P* on the rope is moving toward which position?



(1) *A* (3) *C*
(2) *B* (4) *D*

43 A sound wave can *not* be
1 reflected 3 diffracted
2 refracted 4 polarized

44 Only coherent wave sources produce waves that
1 are the same in frequency
2 have the same speed
3 have a constant phase relation
4 are polarized in the same plane

45 Which is an example of a longitudinal wave?
(1) gamma ray (3) sound wave
(2) X-ray (4) water wave

Waves

1. 1	16. 2	31. 2
2. 2	17. 1	32. 3
3. 1	18. 1	33. 4
4. 1	19. 2	34. 3
5. 3	20. 4	35. 4
6. 2	21. 1	36. 2
7. 4	22. 1	37. 1
8. 3	23. 2	38. 4
9. 3	24. 3	39. 3
10. 2	25. 3	40. 2
11. 4	26. 2	41. 1
12. 3	27. 3	42. 3
13. 4	28. 2	43. 4
14. 3	29. 4	44. 3
15. 4	30. 2	45. 3