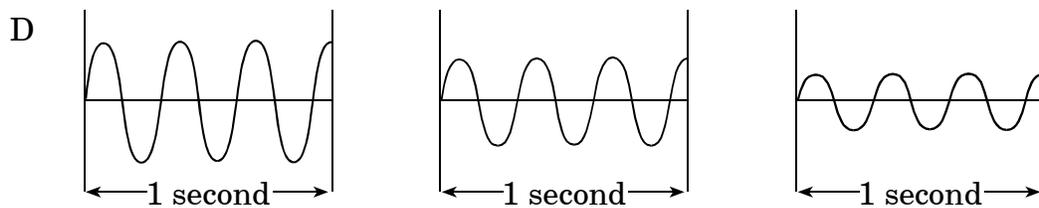
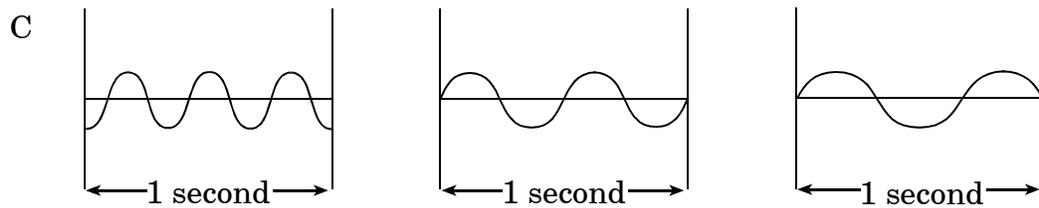
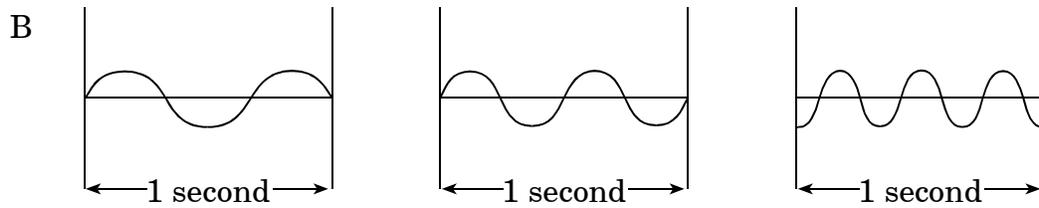
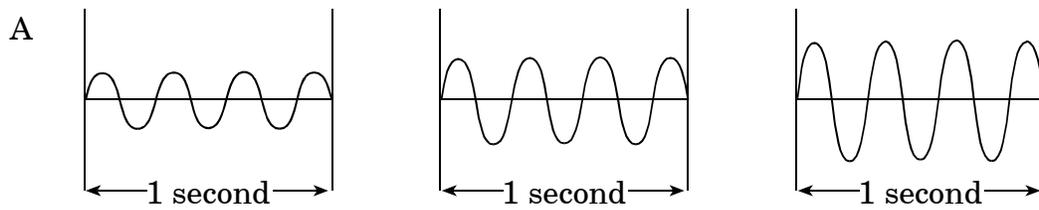
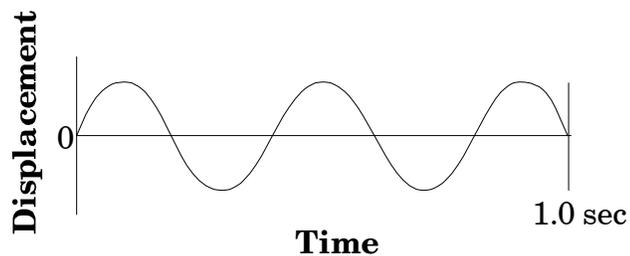


1. Which set of waves shown below is in order from highest to lowest frequency?

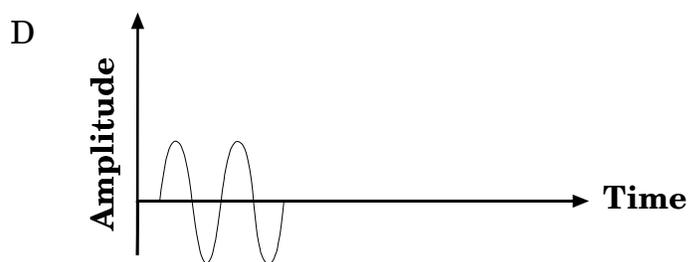
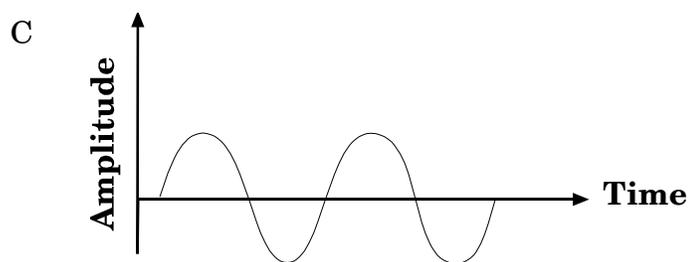
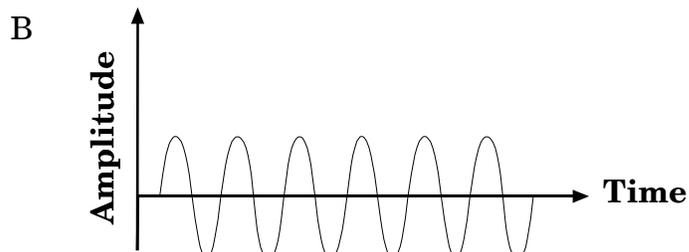
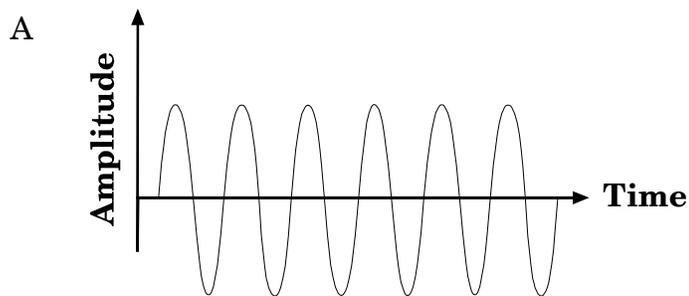


2. What is the period of the wave shown below?



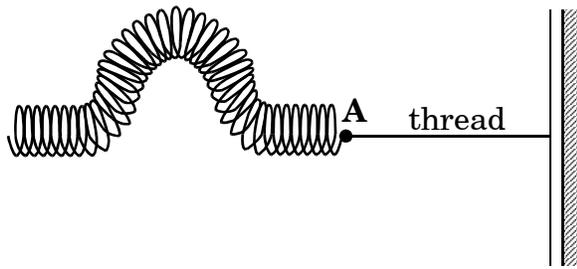
- A 0.10 s
- B 0.40 s
- C 1.0 s
- D 2.5 s

3. Assuming the waves all have the same velocity, which wave has the *lowest* frequency?



4. What is the period of a wave that has a wavelength of 0.80 m and is traveling at 2.0 m/s?
- A 0.40 s
 - B 0.63 s
 - C 4.0 s
 - D 6.3 s
5. A student sits on one side of a door sending a horizontal pulse along a rope that runs under the door. The reflected pulse is inverted. What information can be inferred from this observation?
- A The rope is unattached.
 - B The rope is attached to a rigid boundary.
 - C The rope is attached to a more flexible boundary.
 - D The rope is attached to a boundary that has equal rigidity as the rope.
6. A physicist measures the speed of an electromagnetic wave as 1.3×10^8 m/s in a medium. What is the index of refraction of the medium?
- A 0.43
 - B 2.3
 - C 2.5
 - D 3.9
7. In which media would sound waves travel fastest?
- A a vacuum
 - B air
 - C water
 - D glass

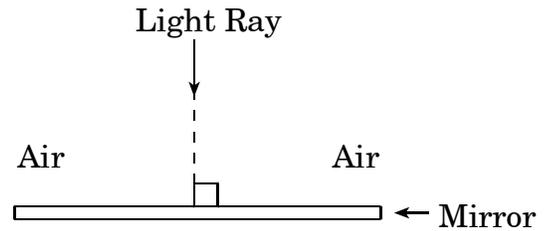
8. A pulse travels from a spring to a thin thread that is attached to a wall.



Which **best** describes the pulse in the thread after it leaves the spring at point A?

- A The pulse is upright.
- B The pulse is inverted.
- C The pulse stops.
- D The pulse is totally reflected with no transmission.

9. A light ray is incident on a plane mirror as shown in this diagram.



What is the angle of reflection?

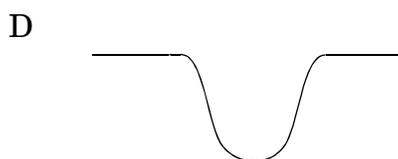
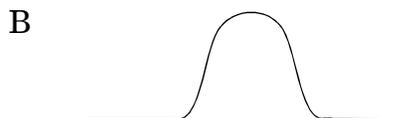
- A 0°
- B 30°
- C 45°
- D 90°

10. A child is playing with a string attached to a doorknob. She sends a series of pulses down the string. Assume that the pulses are reflected with no loss of amplitude. If all the pulses have an amplitude of 15 cm, which **best** describes what the child sees where an incident pulse and reflected pulse meet?
- A a larger pulse of 30 cm
 - B a smaller pulse of 15 cm
 - C Both pulses are seen on either side, each with an amplitude of 15 cm.
 - D No pulse is seen where the two pulses meet.

11. Two wave pulses are traveling on a rope in opposite directions, as shown in the diagrams. The wave pulses have the same length and amplitude.



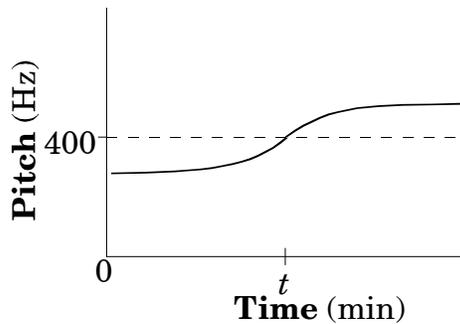
When wave X meets wave Y, what will *most likely* be the appearance of the resulting pulse?



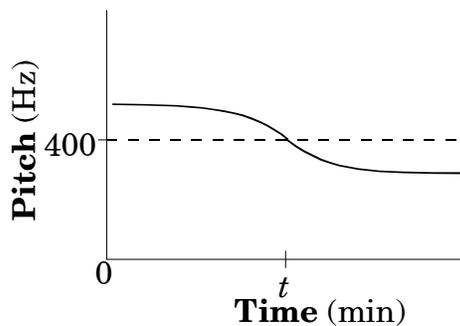
12. Both constructive and destructive interference are a result of wave superposition. The result of interference can *best* be described by which statement?
- A the algebraic sum of the individual displacements
 - B the algebraic product of the individual displacements
 - C the exponential relationship between individual displacements
 - D the inverse relationship between individual displacements

13. A train whistle produces a pitch of 400 Hz when the train is not moving. If an observer is stopped at a railroad crossing and the train passes him at time t , what pitch is heard by the observer?

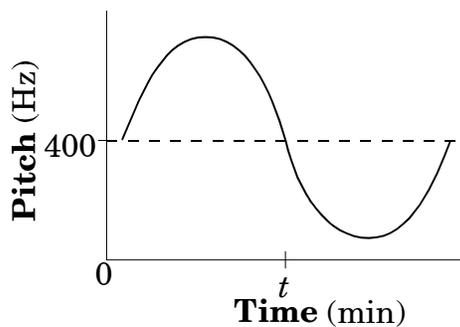
A



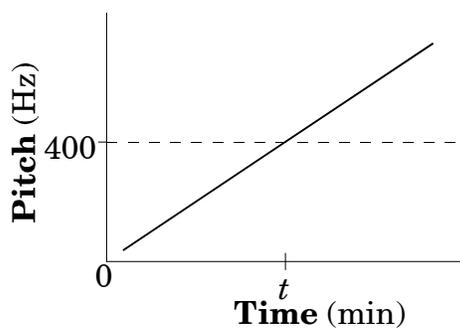
B



C



D



14. The stars in a galaxy emit light with a wavelength of 300 nm, but this light appears to have a wavelength of 400 nm to an astronomer on Earth. Which describes the motion of the galaxy relative to Earth?

- A away from Earth
 B toward Earth
 C left of Earth
 D right of Earth

End of Goal 7 Sample Items

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Physics Goal 7

Sample Items Key Report

7	Objective: 7.02 Describe the behavior of waves in various media. Thinking Skill: Knowledge	Correct Answer: D
8	Objective: 7.02 Describe the behavior of waves in various media. Thinking Skill: Knowledge	Correct Answer: A
9	Objective: 7.03 Analyze the behavior of waves at boundaries between media: A. Reflection, including the law of reflection. B. Refraction, including Snell's law - conceptual. C. Computational Snell's law. Thinking Skill: N/A	Correct Answer: A
10	Objective: 7.04 Analyze the relationship between the phenomena of interference and the principle of superposition. Thinking Skill: Integrating	Correct Answer: D
11	Objective: 7.04 Analyze the relationship between the phenomena of interference and the principle of superposition. Thinking Skill: Integrating	Correct Answer: B
12	Objective: 7.04 Analyze the relationship between the phenomena of interference and the principle of superposition. Thinking Skill: Generating	Correct Answer: A
13	Objective: 7.05 Analyze the frequency and wavelength of sound produced by a moving source (the Doppler Effect). Thinking Skill: N/A	Correct Answer: B
14	Objective: 7.05 Analyze the frequency and wavelength of sound produced by a moving source (the Doppler Effect). Thinking Skill: N/A	Correct Answer: A