

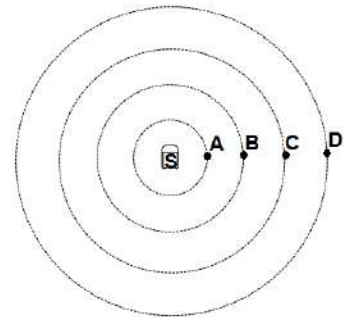
**Sound Waves Multiple Choice**  
*PSI Physics*

Name \_\_\_\_\_

1. Two sound sources  $S_1$  and  $S_2$  produce waves with frequencies 1000 Hz and 500 Hz. When we compare the speed of wave 1 to the speed of wave 2 the result is:
- (A) Twice as great                      (B) One-half as great                      (C) The same  
 (D) Four times great                      (E) One-fourth as great

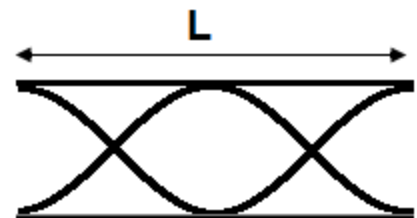
2. Which of the following is a true statement about the speed of sound in three different materials: air, water, and steel?
- (A)  $V_{\text{air}} > V_{\text{water}} > V_{\text{steel}}$   
 (B)  $V_{\text{air}} > V_{\text{water}} = V_{\text{steel}}$   
 (C)  $V_{\text{air}} = V_{\text{water}} < V_{\text{steel}}$   
 (D)  $V_{\text{air}} < V_{\text{water}} > V_{\text{steel}}$   
 (E)  $V_{\text{air}} < V_{\text{water}} < V_{\text{steel}}$

3. A sound source S radiates a sound wave in all directions. The relationship between the distances is  $SA = AB = BC = CD$ . Which of the following points oscillates at the highest frequency?
- (A) Point A                      (B) Point B  
 (C) Point C                      (D) Point D  
 (E) All points have the same frequency



4. The loudness of a sound wave increases with increasing which of the following:  
 (A) Frequency                      (B) Amplitude                      (C) Period                      (D) Wavelength                      (E) Speed of sound
5. A sound wave travels from air into water. Which of the following doesn't change?  
 (A) Frequency                      (B) Amplitude                      (C) Speed of Particles                      (D) Wavelength  
 (E) Speed of sound
6. A sound wave resonates in a tube with two open ends and a length L. What are the wavelengths of the three lowest resonating frequencies generated in the tube?  
 (A) L, 2L, 3L                      (B) 2L, L, 2L/3                      (C) L/2, L/3, L/5  
 (D) L/3, L/5, L/7                      (E) 4L, 4L/3, 4L/5
7. The lowest frequency in an open tube is 250 Hz. What are the three following frequencies that will resonate in the tube?  
 (A) 500Hz, 750Hz, 1000Hz                      (B) 100Hz, 200Hz, 400Hz                      (C) 250Hz, 500Hz, 750Hz  
 (D) 150Hz, 450Hz, 850Hz                      (E) 50Hz, 100Hz, 150Hz

8. The lowest frequency in an open tube is 100 Hz. Which of the following frequencies will resonate in the tube?  
 (A) 25Hz                      (B) 50Hz                      (C) 150Hz                      (D) 200 Hz                      (E) 250Hz

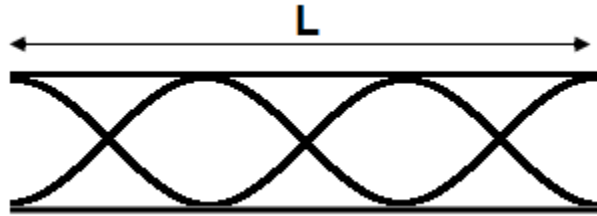


Use the diagram to the right to answer questions 9 and 10.

9. A sound wave resonates in an open pipe with a length of 1 m. What is the wavelength of the wave?  
 (A) 0.5 m (B) 1.0 m (C) 1.5 m  
 (D) 2.0 m (E) 2.5 m

10. A sound wave resonates in an open pipe with a length of 2 m. What is the resonating frequency?  
 ( $V_{\text{sound}} = 340 \text{ m/s}$ )  
 (A) 85 Hz (B) 170 Hz (C) 340 Hz (D) 510 Hz (E) 680 Hz

Use the diagram to the right to answer questions 11 and 12.



11. A sound wave resonates in an open pipe with a length of 6 m. What is the wavelength of the wave?

(A) 1.5 m (B) 2.0 m (C) 3.0 m (D) 4.0 m (E) 6.0 m

12. A sound wave resonates in an open pipe with a length of 1.5 m. What is the resonating frequency?

( $V_{\text{sound}} = 340 \text{ m/s}$ )

(A) 85 Hz (B) 170 Hz (C) 340 Hz (D) 510 Hz (E) 680 Hz

13. A sound wave resonates in a tube with one open end and a length  $L$ . What are the wavelengths of the three lowest resonating frequencies generated in the tube?

(A)  $L, 2L, 3L$  (B)  $L, 2L, 2L/3$  (C)  $L/2, L/3, L/5$   
 (D)  $L, 3L, 5L$  (E)  $4L, 4L/3, 4L/5$

14. The lowest frequency in a closed tube is 200 Hz. What are the three following frequencies will resonate in the tube?

(A) 600Hz, 1000Hz, 1400Hz (B) 100Hz, 200Hz, 400Hz (C) 400Hz, 600Hz, 800Hz  
 (D) 900Hz, 1500Hz, 2100Hz (E) 50Hz, 100Hz, 150Hz

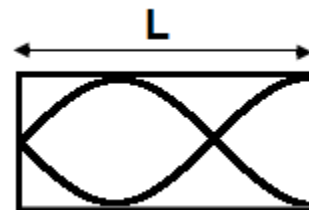
15. The lowest frequency in a closed tube is 300 Hz. Which of the following frequencies will resonate in the tube?

(A) 900Hz (B) 1000Hz (C) 1200Hz (D) 2500 Hz (E) 3000Hz

16. Two sound sources generate pure tones of 500 Hz and 525 Hz. What is the beat frequency?

(A) 5Hz (B) 10Hz (C) 15Hz (D) 20Hz (E) 25Hz

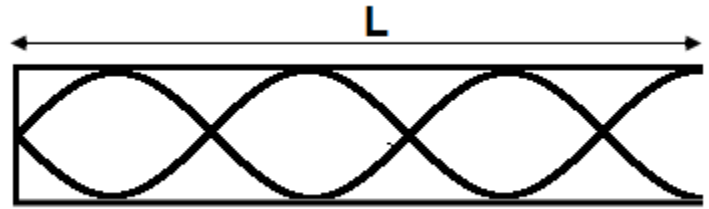
17. A sound wave resonates in a closed pipe with a length of 3.0m. What is the wavelength of the wave?



- (A) 1.5 m   (B) 2.0 m   (C) 3.0 m   (D) 4.0 m   (E) 6.0 m

18. A sound wave resonates in a closed pipe with a length of 3.5 m. What is the wavelength of the wave?

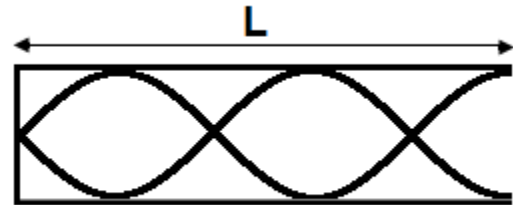
- (A) 1.5 m      (B) 2.0 m      (C) 2.5 m  
(D) 3.0 m      (E) 6.0 m



19. A sound wave resonates in a closed pipe with a length of 2.5 m. What is the resonating frequency?

( $v_{\text{sound}} = 340 \text{ m/s}$ )

- (A) 85 Hz      (B) 170 Hz      (C) 340 Hz  
(D) 510 Hz      (E) 680 Hz



20. Two sound sources produce waves with slightly different frequencies. What happens with the beat frequency if the frequency of the lowest tone increases and passed the higher tone?

- (A) Increases  
(B) Decreases  
(C) Stays the same  
(D) Increases and then decreases  
(E) Decreases and then increases

## Answers

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