Suggested problems: Chapter 17- HRW-Principles of Physics- ISV 10th Edition.

8. A sound source *A* and a reflecting surface *B* move directly toward each other. Relative to the air, the speed of source *A* is 20.0 m/s, the speed of surface *B* is 80.0 m/s, and the speed of sound is 329 m/s. The source emits waves at frequency 2000 Hz as measured in the source frame. In the reflector frame, what are the (a) frequency and (b) wavelength of the arriving sound waves? In the source frame, what are the (c) frequency and (d) wavelength of the sound waves reflected back to the source?

Answer: (a) 2.65×10^3 Hz; (b) 0.124 m; (c) 3.71×10^3 Hz; (d) 0.0887 m

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16. Organ pipe A , with both end open, has a fundamental frequency of 425 Hz. The fifth harmonic is set organ pipe , with one open end , has the same frequency as the second harmonics of pipe A. How long are pipe A and B?

Answer: 40.4 cm, 50.4 cm

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32. Two sounds differ in sound level by 3.00 dB. What is the ratioof the greater intensity to the smaller intensity?

Answer: 2.00

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34. A man strikes one end of a thin rod with a hammer. The speed of sound in the rod is 15 times the speed of sound in air. A woman, at the other end with her ear close to the rod, hears the sound of the blow twice with a 60.0 ms interval between; one sound comes through the rod and the other comes through the air alongside the rod. If the speed of sound in air is 343 m/s, what is the length of the rod?

Answer:22 m

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52. In Fig. 17-32, sound with a 65.0 cm wavelength travels rightward from a source and through a tube that consists of a straight portion and a half-circle. Part of the sound wave travels through the half-circle and then rejoins the rest of the wave, which goes directly through the straight portion. This rejoining results in interference. What is the smallest radius *r* that results in an intensity minimum at the detector?

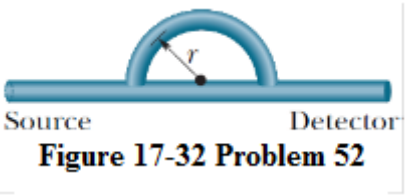

Figure 17-32 Problem 52

Answer: 28.5 cm

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62. The pressure in a traveling sound wave is given by the equation $\Delta p = (2.00\text{ Pa}) \sin\{\pi[(0.900\text{ m}^{-1})x - (450\text{ s}^{-1})t]\}$. Find the (a) pressure amplitude, (b) frequency, (c) wavelength, and (d) speed of the wave.

Answer: a) 2.00 Pa; b) 225 Hz; c) 2.22 m; d) 500 m/s

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66. From two sources, sound waves of frequency 270 Hz are emitted in phase in the positive direction of x-axis. At a detector that is on the axis and 5.00 m from one source and 4.00 m from the other source , what is the phase difference between the waves (a) radians and (b) as multiple of wavelength ?

Answer: a)4.95rad : b) 0.787