

Physics 102  
Quiz # 2  
Chapter 18

Name: Solution

Id:

Sec. #:

Organ pipe A, with both ends open, has a fundamental frequency of 300 Hz. The third harmonic of organ pipe B, with one end open, has the same frequency as the second harmonic of pipe A. How long are pipe A and pipe B?

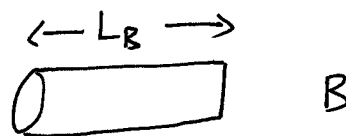
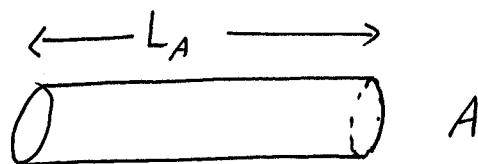
For pipe A

$$f_{1A} = 300 \text{ Hz}$$

$$f_{1A} = \frac{v}{2L_A} = 300$$

$$\Rightarrow L_A = \frac{v}{2 \times 300} = \frac{343}{600}$$

$$\Rightarrow \boxed{L_A = 0.57 \text{ m}}$$



For pipe B

$$f_{3B} = 2 f_{1A} = 600$$

But

$$f_{3B} = \frac{3v}{4L_B} = 600$$

$$\Rightarrow \boxed{L_B = \frac{3 \times 343}{4 \times 600} = 0.43 \text{ m}}$$