

1) Given:  
 closed end  
 $n = 15$   
 $f_{15} = 26.7 \text{ Hz}$   
 $V = 334 \text{ m/s}$   
 $L = ?$

Soln:

$$f_n = n \frac{V}{4L}$$

$$L = n \frac{V}{4f_n} = 15 \frac{(334 \text{ m/s})}{4(26.7 \text{ Hz})}$$

$$L = 46.9 \text{ m}$$

3) Given:  
 $n = 19$   
 open pipe  
 $f_{19} = ?$   
 $V = 334 \text{ m/s}$   
 $L = 86 \text{ m}$

Soln:

$$f_n = n \frac{V}{2L}$$

$$f_{19} = 19 \frac{(334 \text{ m/s})}{2(86 \text{ m})}$$

$$f_{19} = 37 \text{ Hz}$$

4) Given:  
 $f = 35.5 \text{ Hz}$   
 open pipe  
 $n = 75$   
 $L = 3.50 \times 10^2 \text{ m}$   
 $V = ?$

Soln:

$$f_n = n \frac{V}{2L}$$

$$V = \frac{f_n}{n} 2L = \frac{(35.5 \text{ Hz})}{75} 2(3.5 \times 10^2 \text{ m})$$

$$V = 331 \text{ m/s}$$