

find the ratio of length of a closed organ pipe to that of an open pipe in order that the 2nd overtone of the former is in unison with 4th overtone of the latter.

Frequency of second overtone of open pipe is

$$v_o = \frac{3V}{2l_o}$$

Frequency of fourth overtone of closed pipe is

$$v_c = \frac{9V}{4l_c}$$

l_c - length of a closed organ pipe

l_o - length of an open organ pipe

$$\frac{3V}{2l_o} = \frac{9V}{4l_c} \Rightarrow \frac{l_c}{l_o} = \frac{3}{2}$$