Q1 - Answer = c

Q2 - Problem A - Last name A-K

A pipe, open at both ends resonates at a first harmonic frequency $f_{\text{open}}$. If one end is closed its first harmonic frequency is $f_{\text{closed}}$. How do the two frequencies compare?

A. $f_{\text{open}} = f_{\text{closed}}$
B. $f_{\text{open}} = 2f_{\text{closed}}$
C. $f_{\text{closed}} = 2f_{\text{open}}$
D. $f_{\text{open}} = \frac{3}{2} f_{\text{closed}}$
E. $f_{\text{closed}} = \frac{3}{2} f_{\text{open}}$

$f_{\text{open}} = \frac{v}{2L}$ & $f_{\text{closed}} = \frac{v}{4L}$

Thus $2f_{\text{closed}} = f_{\text{open}}$
Q1 - Answer = c
Q2 - Problem B - Last Name L-Z

- Two pipes, one open on both ends with length \( L_{\text{open}} \), the other closed on one end with length \( L_{\text{closed}} \), have identical first harmonic resonant frequencies. How do the two lengths compare?

A. \( L_{\text{open}} = L_{\text{closed}} \)

B. \( L_{\text{open}} = 2 L_{\text{closed}} \)

C. \( L_{\text{closed}} = 2 L_{\text{open}} \)

D. \( L_{\text{open}} = \frac{3}{2} L_{\text{closed}} \)

E. \( L_{\text{closed}} = \frac{3}{2} L_{\text{open}} \)

\[ f = \frac{v}{2L_{\text{open}}} = \frac{v}{4L_{\text{closed}}} \]

\[ L_{\text{open}} = 2L_{\text{closed}} \]