

Answer on Question #51586-Physics-Mechanics-Kinematics-Dynamics

In a resonance column experiment radius of column tube is $r = 2\text{cm}$ and the frequency of tuning fork is $f = 512 \text{ Hz}$. if zero of meter scale coincide with the top end of resonance column then reading of position of water column at resonance (speed of sound $c = 340 \frac{\text{m}}{\text{s}}$) nearly...

1) 18.3 cm. 2) 15.4 cm. 3) 30cm. 4) 16.6cm

Solution

End correction

$$e = 0.3d = 0.6r = 0.6 \cdot 2\text{cm} = 1.2 \text{ cm.}$$

Wavelength

$$\lambda = \frac{c}{f} = \frac{340 \frac{\text{m}}{\text{s}}}{512 \text{ Hz}} = 0.664 \text{ m} = 66.4 \text{ cm.}$$

When the first resonance occurs,

$$L + e = \frac{\lambda}{4} \rightarrow L = \frac{\lambda}{4} - e = \frac{66.4 \text{ cm}}{4} - 1.2 \text{ cm} = 15.4 \text{ cm.}$$

Answer: 2) 15.4 cm.