c.) **One End Open, One End Closed:**

$$v = f_m \lambda_m$$

$$f_m = m f_1 = m \frac{v}{4L}$$

$$\lambda_m = \frac{\lambda_1}{m} = \frac{4L}{m}$$

$$m = 1, 3, 5, 7 \ldots$$

n.b. Only **_odd_**-*m* integers allowed!

Closed End: $\Rightarrow$ **Displacement _node_ & pressure _anti-node_ at** *x* = 0.
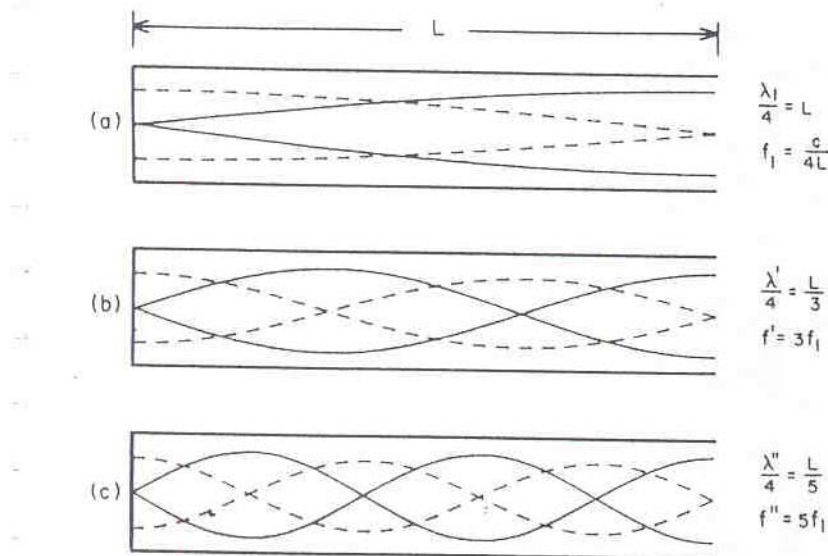**Open   End:** $\Rightarrow$ **Displacement _anti-node_ & pressure _node_ at** *x* = *L*.

Fɪɢ. 9. First three vibration modes of an air column closed at one end and open at the other. Solid lines give displacement amplitudes; dashed lines, pressure amplitudes.