Ch17 - Echo And String Version A.

① $v = \sqrt{\frac{T}{273}} \cdot \left(331 \frac{m}{s}\right)$ ✱

Given:

$T = -2C$

$= 273.15 - 2$

$= 271.15$

probably meaningless precision?

$v = \sqrt{\frac{271.15}{273}}(331)$

$= 329.9$ m/s

$v\Delta t = \Delta x = (2)(.88)(10^3)$ $\Delta x = 2(.88)E3$ meters (↑echo ↑km)

$\Delta t = \frac{\Delta x}{v} = \boxed{5.33 \text{ sec}} = \Delta t \text{ (echo)}$

② $\Delta x = (2)(.88)(10^3) = 1760$m $\Delta t = 5.069$ s want T

$v = 331\sqrt{\frac{T}{273}} \rightarrow v^2 = 331^2 \frac{T}{273} \rightarrow \boxed{T = 273\left(\frac{v}{331}\right)^2}$

$T = \frac{273}{331^2}\left(\frac{1760}{5.069}\right)^2$ since $v = \frac{\Delta x}{\Delta t} \rightarrow T = 300.39$ K

$T_C = 300.39 - 273.15 = \boxed{27.24\ ^\circ C}$

③ mode #

$\frac{n\lambda}{2} = L$ $f\lambda = v$ ✱ From Chapter 16 Oscillatory Motion and Waves

L

Given: $n = 4$

$L = 1.11$ meters

$f = 611$ sec^{-1}

want v:

Do algebra: $\frac{n\lambda}{2} \cdot f = L \cdot f \Rightarrow \frac{nv}{2} = Lf \Rightarrow \boxed{v = \frac{2Lf}{n}}$

$v = \frac{(2)(1.11)(611)}{4} = \boxed{339.1 \text{ m/s} = v}$