Pg 417: 1, 12, 13, 14, 16, 18

1) - increase, since the mass per unit length decreased, speed increases

$\hookrightarrow V = \sqrt{\frac{F}{\mu}}$

- F (frequency) is unchanged
- wavelength increases since $v = \lambda \cdot F$, and F stayed same as speed increased.

12) - increases speed, since $V = \sqrt{\frac{F}{\mu}} \rightarrow$ F increased

- decreases speed, since $V = \sqrt{\frac{F}{\mu}} \rightarrow \mu$ (mass/length) increases

13) - the reaction time of the people and the speed @ which they move

- longitudinal, people move in same direction as pulse
- reaction time of people !
- transverse, people move up & down while wave moves back & forth

14) - move back & forth

- move up & down

16.) if tension stays same, speed stays same so according to $V = \lambda \cdot F$, if F is doubled, λ is cut in half

18.) nothing, speed is independent of "F" if tension is constant

Pg 455: 2, 3, 4, 7, 11, 12

2.) changing the length allows different frequencies to be produced. (trombone

3) Yes, as temp increases, speed increases

4.) resonance develops and passes sound to surrounding air

7.) higher temp increases dimensions (and speed also), causing higher frequency

11.) Creates the second harmonic

12.) Sound ~~[illegible]~~ is good, if not, song sounds jumbled

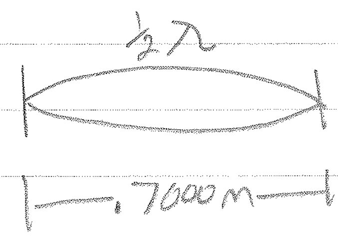
Pg 459 34, 35, 36, 40a

34) $\mu = 6.143 \times 10^{-3}$ kg/m

$V = \sqrt{F/\mu}$

↳ need speed, so need wavelength

1st harmonic



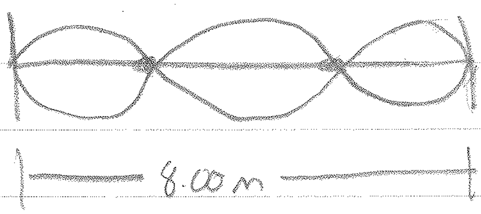
→ so $1\lambda = 1.400m$

$V = \lambda \cdot F = (1.400m)(261.6\ Hz) = 366.24\ m/s$

↳ $V = \sqrt{F/\mu} = 366.24\ m/s = \sqrt{\dfrac{F}{6.143 \times 10^{-3}\ kg/m}}$

$F = 824N$

35)



$F = 49.0N$

$\mu = 5.00 \times 10^{-3}$ kg/m

a) nodes @ 0m

2.67m

5.33m

8.00m

b) $\lambda = \frac{2}{3}L = 5.33m$

$V = \sqrt{\dfrac{F}{\mu}} = \sqrt{\dfrac{49.0N}{5.00 \times 10^{-3}}} = 98.99\ m/s$

$F = V/\lambda = \dfrac{98.99\ m/s}{5.33\ m} = 18.6\ Hz$

Pg 459: 40a),

*need to determine wave speed.

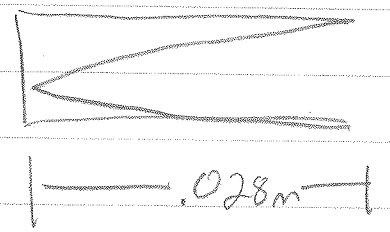
40.) $\lambda = 2.0m/3 \text{ waves} = .67\ m \rightarrow V = .67m \cdot 150Hz = 100.5 m/s$

$F = mg = (5.0kg \cdot 10m/s^2) = 50N$

$V = \sqrt{F/\mu} \rightarrow \mu = \frac{49N}{(100.5m/s)^2} = 4.9 \times 10^{-3} kg/m$

Pg 459: 45, 47, 48 → $V = 349 m/s$

45

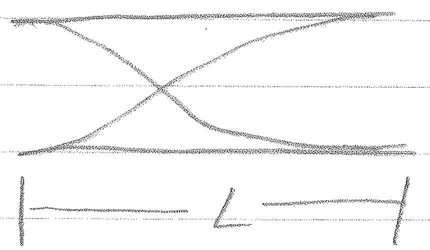


$L = \frac{1}{4}\lambda$

$\lambda = L \cdot 4 = .028m \cdot 4 = .112m$

$F = V/\lambda = 340 m/s / .112m = 3035 Hz$

47) $V = 349 m/s$



$\lambda = L \cdot 2$

*need λ $V = \lambda \cdot F \rightarrow \lambda = V/F = 349 m/s / 300 Hz$

$\lambda = 1.16m$

$L = \lambda/2 = 1.16m/2 = .58m$