

34

SHM #5/4

p769 MC 10 C24

p770 Problems 11, 13, 31, 32
online Beat f Rank

p769 - Multiple Choice

(1)

10) What is pitch?

• none of these

✗ a unit

✗ physical phenomenon

✗ physical quantity

(pitch is perception
of the f of sound)

(1)

- Concept

24) Two speakers, open field

• no sound some spots

• loud sound some spots

A) loud sound \rightarrow constructive interference
 \rightarrow whole wavelengths

(1)

$$a - b = n\lambda \quad \text{for } n = 1, 2, 3, \dots$$

B) no sound \rightarrow destructive interference
 \rightarrow $\frac{1}{2}$ wavelengths

$$a - b = (n + \frac{1}{2})\lambda \quad \text{for } n = 1, 2, 3, \dots$$

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P 770 - Problems

- 11) Hearing range $20\text{ Hz} \rightarrow 20,000\text{ Hz}$
 $\lambda = ?$ at extremes

(1) $v_{\text{sound}} = 340\text{ m/s}$ a) $\lambda_1 = \frac{v}{f} = \frac{340\text{ m/s}}{20\text{ Hz}} = 17\text{ m}$
 (at STP)

b) $\lambda_2 = \frac{v}{f} = \frac{340\text{ m/s}}{20,000\text{ Hz}} = 0.017\text{ m}$

13) $v_{\text{radio}} = 1.7 \times 10^8\text{ m/s}$ in ice $t_{\text{down}} = 16.45 \times 10^{-6}\text{ s}$

$t_{\text{total}} = 32.9 \times 10^{-6}\text{ s}$

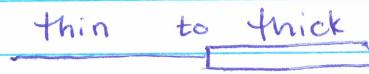
depth?

$d = vt = (1.7 \times 10^8\text{ m/s})(16.45 \times 10^{-6}\text{ s})$

= 2800 m

= 2.8 km

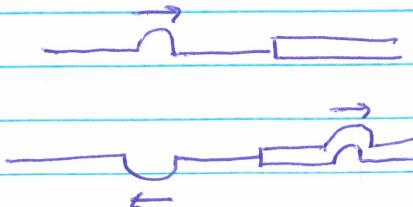
(1) $m_1 = 5.0\text{ kg}$
 $l_1 = 20\text{ m}$

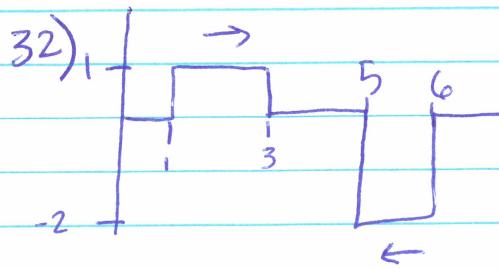


(1) $m_2 = 8.0\text{ kg}$
 $l_2 = 16\text{ m}$

before

after





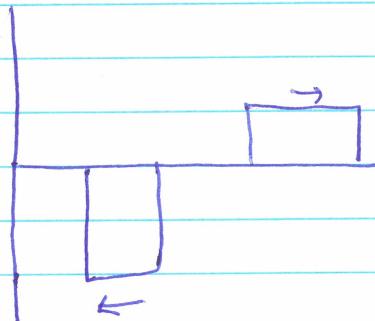
$V = 10 \text{ m/s}$ each

draw $y(x)$

~~$t = 0.25\text{s}$~~

$t = 0.3\text{s}$

↑
online just
one



pass by + keep
going

- Online Beat f Rank

Kira plucks low E

others pluck theirs
& record f_{beat}

A) Rank f

✗ Cannot determine

$f_{\text{beat}} = \text{difference}$

don't know
if higher
or lower

B) (now know ↑ or ↓ too)

large

Buffy
 4 Hz

Aiko
 3 Hz

Chandra
 1 Hz

small

Freja
 3 Hz

Evita
 5 Hz