Phys 11 H

Answer Key

Pg 202

#3 (a) #cycles = 1800, time = 60s

$f = \frac{1800}{60s} = \boxed{30\,Hz}$

$T = \frac{60s}{1800} = \boxed{3.3 \times 10^{-2}\,s}$

(b) #cycles = 1800, time = 20.0s

$f = \frac{1800}{20.0s} = \boxed{90.0\,Hz}$

$T = \frac{20.0s}{1800} = \boxed{1.11 \times 10^{-2}\,s}$

(c) #cycles = 460 → 640, time = 60s

$f = \frac{460}{60s} \rightarrow \frac{640}{60s}$

$\boxed{f = 7.7\,Hz \rightarrow 11\,Hz}$

$T = \frac{60s}{460} \rightarrow \frac{60s}{640}$

$\boxed{T = 0.13s \rightarrow 9.4 \times 10^{-2}\,s}$

(d) #cycles = 1, time = 60s

$f = \frac{1}{60s} = \boxed{1.7 \times 10^{-2}\,Hz}$

$\boxed{T = 60s}$

(e) #cycles = 1

time $= \left(60\frac{s}{min}\right) \times \left(60\frac{min}{h}\right) = 3600s$

$f = \frac{1}{3600s} = \boxed{2.8 \times 10^{-4}\,Hz}$

$\boxed{T = 3.6 \times 10^{3}\,s}$

Pg 234

#3. #cycles = 16, time = 21s

$f = \frac{\#cycles}{time} = \frac{16}{21s} = \boxed{0.76\,Hz}$

$T = \frac{time}{\#cycles} = \frac{21s}{16} = \boxed{1.3\,s}$

4. (b) #cycles = 122000, time = 15h 26 min = 55560 s

$T = \frac{time}{cycles} = \frac{55560s}{122000} = \boxed{0.46s}$

(c) $f = \frac{122000}{55560s}$

Phys 11H

Answer key

Pg 201 (1, 2, 4, 5)

#1 (a) transverse
(b) longitudinal
(c) longitudinal

2. (a) transverse
(b) Amp = $\frac{17\text{cm}}{2}$ = $\boxed{8.5\text{cm}}$
(c) distance per cycle = 2 × 17cm
distance in 5 cycles = 5 × (2 × 17cm)
$\boxed{d = 1.7 \times 10^2\text{cm}}$

4. (a) longitudinal
(b) Amp = $\frac{7.0\text{cm}}{2}$ = $\boxed{3.5\text{cm}}$
(c) distance in 3.5 cycles = 3.5 × (2 × 7.0cm) = $\boxed{49\text{cm}}$

5. (a) $\boxed{T = \frac{1}{f}}$ (b) $\boxed{\text{as length increases, T increases}}$
(c) frequency is not dependent on mass of a pendulum.

Pg 234 # 1, 2, 6 → 10

1. (a) longitudinal
(b) torsional
(c) transverse
(d) torsional

2. 
distance in one cycle = 4 × Amp.
∴ Amp = $\frac{14\text{cm}}{4}$ = $\boxed{3.5\text{cm}}$

p134

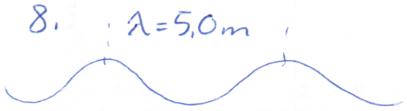
6. $f = 5.0\times10^{2}\ Hz$
$\lambda = 3.0\ m$
$v = ?$

$v = f\lambda$
$= (5.0\times10^{2}\ Hz)(3.0\ m)$
$\boxed{v = 1.5\times10^{3}\ m/s}$

7. $\lambda = 6.0\ m$
$v = 5.6\ m/s$

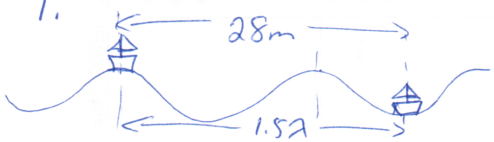
(a) $v = f\lambda$
$\therefore f = \frac{v}{\lambda} = \frac{5.6\ m/s}{6.0\ m} = \boxed{9.3\times10^{-1}\ Hz}$

(b) $T = \frac{1}{f} = \frac{6.0\ m}{5.6\ m/s} = \boxed{1.1\ s}$

8. 

$d = 8.6\ m$
$t = 5.0\ s$
$\therefore v = \frac{d}{t} = \frac{8.6\ m}{5.0\ s}$

$v = f\lambda$
$\therefore f = \frac{v}{\lambda} = \frac{(8.6\ m/5.0\ s)}{5.0\ m}$
$\boxed{f = 3.4\times10^{-1}\ Hz}$

9. 

# cycles = 15
time = 1.0 min = 60 s

$1.5\lambda = 28\ m$
$\therefore \lambda = \frac{28\ m}{1.5}$

$f = \frac{\#\ cycles}{time} = \frac{15}{60\ s}$

$v = f\lambda$
$= \left(\frac{15}{60\ s}\right)\left(\frac{28\ m}{1.5}\right)$
$\boxed{v = 4.7\ m/s}$

10. $\lambda = 3.7\ m$
$T = 1.5\ s$

(a) $v = f\lambda = \frac{\lambda}{T} = \frac{3.7\ m}{1.5\ s} = \boxed{2.5\ m/s}$ (2.466667 m/s)

(b) $v = \frac{d}{t}$ $\therefore t = \frac{d}{v} = \frac{1.0\times10^{2}\ m}{2.466667\ m/s} = \boxed{41\ s}$

(c) $d = v\times t = (2.466667\ m/s)\times(60.0\ s)$
$\boxed{d = 1.5\times10^{2}\ m}$