

$$1) a) \omega = 6.2$$

$$\omega = 2\pi f$$

$$f = \frac{\omega}{2\pi}$$

$$f = \frac{6.2}{2\pi}$$

$$f = 0.987 \text{ Hz} \quad T = \frac{1}{f} = \frac{1}{0.987} = 1.0135$$

$$b) k = 0.410$$

$$k = \frac{2\pi}{\lambda}$$

$$c) v = f\lambda$$

$$= (0.987)(15.32)$$

$$v = 15.12 \text{ cm/s}$$

$$\lambda = \frac{2\pi}{k}$$

$$= \frac{2\pi}{0.410}$$

$$\lambda = 15.32 \text{ cm}$$

$$d) v(x,t) = -A\omega \sin[\dots]$$

$$|v_{\max}| = A\omega(1)$$

$$= A\omega$$

$$= (2.75 \text{ cm})(6.20)$$

$$= 17.05 \text{ cm/s}$$

$$2) v = f\lambda$$

$$f = \frac{\omega}{2\pi}$$

$$\lambda = \frac{2\pi}{k}$$

$$f = \frac{5.6}{2\pi}$$

$$\lambda = \frac{2\pi}{5.2}$$

$$f = 0.89 \text{ Hz} \quad \lambda = 2.856$$

$$v = 2.55 \text{ m/s}$$

$$3) a) \omega = 4.16$$

$$T = \frac{1}{\omega}$$

$$b) F_s = kx$$

$$= 1/0.06$$

$$f = \frac{\omega}{2\pi}$$

$$= \frac{4.16}{2\pi}$$

$$T = 1.51 s$$

$$f = 0.66$$

$$k = \frac{F_s}{x}$$

$$= \frac{0.144 N}{0.074 m}$$

$$k = 1.95 N/m$$

$$c) |V_{max}| = A\omega$$

$$= (7.40 \text{ cm}) (4.16 \text{ rad/s})$$

$$V_{max} = 30.78 \text{ cm/s}$$

← Incorrect Units in Pearson

$$d) |F_{max}| = \frac{1}{2} m v^2$$

$$= \frac{1}{2} (3kg) (0.31 \text{ m/s})^2$$

$$F_{max} = 0.104 N$$

$$g) a(1.00) = -7.4 (4.16^2) \cos(?)$$

$$= 4.16^2 (x(1.00))$$

$$a(1.00) = 21.57 \frac{\text{cm}}{\text{s}^2}$$

$$= 0.216 \frac{\text{m}}{\text{s}^2}$$

$$e) x(1.00) = 7.40 \text{ cm} \cos(4.16 - 2.42)$$

$$x(1.00) = -1.25 \text{ cm}$$

$$= -0.0125 \text{ m}$$

$$h) F_s = kx$$

$$= 1.95 (x(1.00))$$

$$F_s = -0.02113 N$$

$$f) V(1.00) = -7.40 (4.16) \sin(4.16 - 2.42)$$

$$= -70.3 \frac{\text{cm}}{\text{s}}$$

$$= -0.303 \frac{\text{m}}{\text{s}}$$

$$4) a) V = f\lambda$$
$$f = \frac{V}{\lambda}$$

$$f = \frac{8 \text{ m/s}}{0.72 \text{ m}}$$

$$(f = 25 \text{ Hz})$$

$$c) k = \frac{2\pi}{\lambda}$$

$$= \frac{2\pi}{0.72 \text{ m}}$$

$$(k = 19.64)$$

$$d) \omega = 2\pi f$$

$$\omega = 50\pi$$

$$y(x,t) = A \sin [19.64x + 50\pi t]$$

$$or = 0.07 \cos [19.64x + 50\pi t + \frac{\pi}{2}]$$

$$e) y(0.36 \text{ m}, 0.15 \text{ s}) = 0.07 \sin [19.64(0.36) + 50\pi(0.15)]$$

$$= 0.07 \sin [30.63]$$

$$(y = -0.0494 \text{ m})$$

$$f) 4\pi - 0.15$$

$$\frac{4}{25} - 0.15$$

$$(= 0.015)$$

$$\textcircled{a}) \quad \omega = 7.22$$

$$\textcircled{a}) \quad f = 2\pi\omega$$

$$f = 45.76 \text{ Hz}$$

$$\textcircled{a}) \quad \tau = \frac{1}{f} = 0.0220 \text{ s}$$

$$\textcircled{b}) \quad \lambda = \frac{2\pi}{f} \tau$$

$$= \frac{2\pi}{45.76 \text{ Hz}} \cdot 0.0220 \text{ s}$$

$$\lambda = 0.0220 \text{ m}$$

$$\textcircled{c}) \quad v = f\lambda$$

$$= (45.76 \text{ Hz})(0.0220 \text{ m})$$

$$\textcircled{c}) \quad = 0.926 \text{ m/s}$$